Vol. 918 Number 5

# OFFICIAL GAZETTE

of the
UNITED STATES PATENT OFFICE

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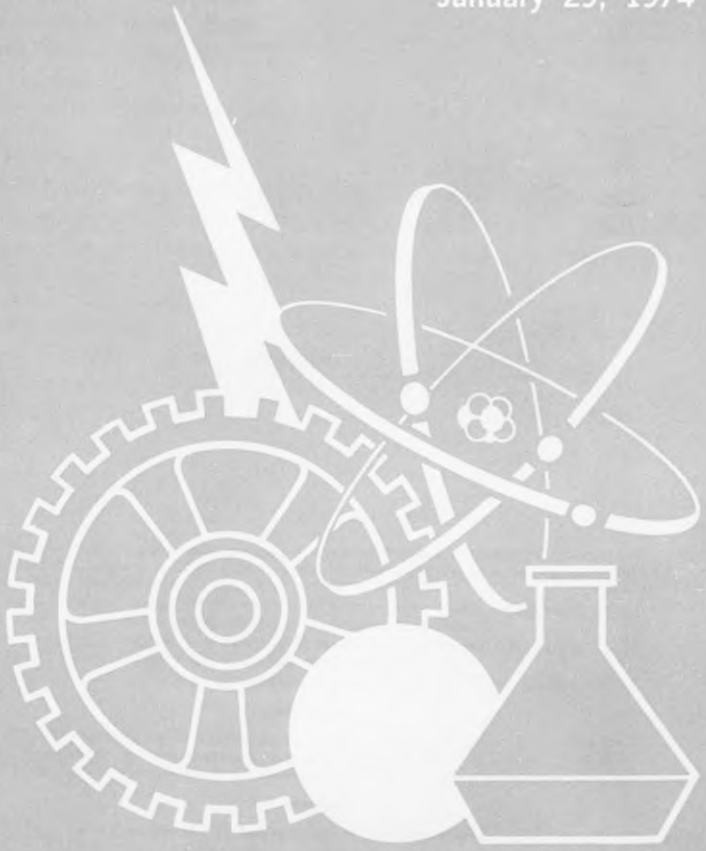
PATENTS

January 29, 1974



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OFFICIAL GAZETTE of the UNITED STATES PATENT OFFICE

January 29, 1974 Volume 918 Number 5

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# PATENT OFFICE NOTICES

## Availability of Consolidated Listing

The "Consolidated Listing of Recent Official Gazette Notices—Re Patent Office Practices and Procedures" which appeared in the Official Gazette of January 1, 1974 (918 O.G. 3–97) is available in separate reprints at a price of $1.15 from the Superintendent of Documents, Washington, D.C. 20402.

RENE D. TEGTMEYER
Jan. 2, 1974. *Acting Commissioner of Patents.*

## Bogsch Appointed Director General of World Intellectual Property Organization (WIPO)

Dr. Arpad Bogsch has been appointed by the General Assembly of the World Intellectual Property Organization as Director General of the Organization. The appointment was by acclamation of the General Assembly of WIPO on November 21, 1973, during the second ordinary session held in Geneva. He assumed his duties December 1, 1973.

Dr. Bogsch succeeds Professor G. H. C. Bodenhausen, a national of the Netherlands, who retired at the end of November after having directed the Organization since 1963.

RENE D. TEGTMEYER
Jan. 2, 1974. *Acting Commissioner of Patents.*

## Time for Filing Opposition to Marks Published in the December 25, 1973 Issue of the Official Gazette

It has come to the attention of the Patent Office that there was a delay at the Government Printing Office in mailing to subscribers the Trademark Section of the OFFICIAL GAZETTE for December 25, 1973.

In view of the delay in mailing, the publication date for marks published for opposition in the December 25, 1973 issue will be deemed to be January 9, 1974. The opposition period for those marks will end on February 8, 1974.

JOSEPH F. NAKAMURA,
Jan. 9, 1974. *Acting Commissioner of Patents.*

## Patent Suits

Notices under 35 U.S.C. 290; Patent Act of 1952

**2,765,699,** J. La Torre, BLIND BOLT UTILIZING DISTORTABLE COLLAR AND DEFORMABLE LOCKING NUT MEMBER, **filed** Apr. 12, 1971, D.C., C.D. Calif. (Los Angeles), Doc. 71–877–HP, *National Screw & Manufacturing Co.* v. *Lockheed Aircraft Corp. et al.* Filed stipulation for dismissal of plaintiff's complaint with prejudice and defendant counterclaim dismissed with prejudice, July 2, 1973.

**2,824,011,** B. E. Williams, METHOD OF CLOTHING MEAT, **filed** June 28, 1973, D.C., C.D. Calif. (Los Angeles), Doc. 73–1482–LTL, *Bemis Company, Inc. and Beverly E. Williams* v. *Chromalloy American Corporation.*

**2,973,643,** Roderick and Gwathmey, AIRCRAFT RATE OF CLIMB INDICATING INSTRUMENTS, **filed** June 27, 1973, D.C. Kans. (Wichita), Doc. W–4728, *Teledyne, Inc.* v. *Aerosonics Corporation and MacLeod of Kansas, Inc., a division of Aerosonics Corporation.* Consent decree: Ordered, plaintiff owner of said patent, defendants have infringed said patent, counterclaims are dismissed with prejudice, June 26, 1973.

**3,087,832,** M. V. Fogle, TRANSFERABLE MAGNETIC COATING COMPOSITION AND TRANSFER WEB COATED THEREWITH, **filed** June 14, 1973, D.C., N.D. Ill. (Chicago), Doc. 73c1542, *The National Cash Register* v. *Allen Paper Co., Cardunal Office, comprises Charles A. Weightman, individual et al. and Clopay Corp.*

**3,092,404,** W. MacWilliam, PACKED SCREW THREADED GLAND TYPE TUBE COUPLING FOR THIN WALLED TUBING, **filed** June 29, 1973, D.C. Ohio (Toledo), Doc. C–73–267, *Scovill Manufacturing Company* v. *Fayette Tubular Products, Inc.*

**3,163,645,** De Stevens and Werner, DERIVATIVES OF 3,4-DIHYDRO - 2 - H-[1,2,4]-BENZOTHIADIAZINE-1,1-DIOXIDES, **filed** June 8, 1973, D.C.N.J. (Newark), Doc. C–806–73, *Ciba-Geigy Corporation* v. *Zenith Laboratories, Inc. et al.*

**3,268,636,** R. G. Angell, Jr., METHOD AND APPARATUS FOR INJECTION MOLDING FOAMED PLASTIC ARTICLES, **filed** Nov. 22, 1972, D.C., N.D. Ohio (Toledo), Doc. C–72–426, *Union Carbide Corporation* v. *Borg-Warner Corporation.*

**3,309,025,** W. R. Malcolm, SELF-CLEANING SPRAY DEFLECTOR WEDGE FOR SPRINKLERS, **filed** June 12, 1973, D.C., E.D. Calif. (Fresno), Doc. F–818–C, *Rain Bird Sprinkler Mfg. Corp.* v. *Buckner Industries, Inc.*

**3,357,561,** Schmid and Anderson, ROOF DRAIN, **filed** May 17, 1971, D.C., N.D. Ohio (Cleveland), Doc. C–71–525, *Zurn Industries, Inc.* v. *Barrett-Rupp, Inc. and Jay R. Smith Mfg. Co.* Stipulation and order dismissing action without prejudice, June 18, 1973.

**3,391,773,** Nicole and Pylant, PROPORTIONAL SPACING EMBOSSING TOOL; **3,485,335,** J. McMahon, TAPE EMBOSSING MACHINE WITH SELECTIVELY VARIABLE TAPE FEED INCREMENTS, **filed** June 18, 1973, D.C., N.D. Ill. (Chicago), Doc. 73c1567, *W. H. Brady Co.* v. *Dymo Industries, Inc. and CT Corporation System.*

**3,407,685,** E. D. Prince, GROOVED TIE BAR ASSEMBLY FOR DIE CASTING MACHINES AND THE LIKE, **filed** June 15, 1973, D.C., W.D. Mich. (Grand Rapids), Doc. G145–73 CA, *Prince Corporation* v. *B & T Machinery Company.*

**3,413,171,** D. F. Hannon, PROCESS OF MAKING IDENTIFICATION CARDS; **3,417,497,** same, IDENTIFICATION CARD, **filed** June 15, 1973, D.C., N.D. Ill. (Chicago), Doc. 73c1554, *Laminex, Inc.* v. *Ronald C. Fritz et al.*

**3,417,497.** (See 3,413,171.)

**3,485,335.** (See 3,391,773.)

**3,527,018,** D. E. Jahnke, VACUUM PACKAGING OF POULTRY, **filed** July 6, 1971, D.C., E.D. Wis. (Milwaukee), Doc. 70C–535, *Vac-Air, Inc.* v. *John Mohr & Sons, Inc.* Judgment order: Complaint dismissed with prejudice, counterclaim against Vac-Air dismissed with prejudice, June 26, 1973.

**3,570,018,** Sargent, Sargent and Sargent, PORTABLE TOILET, **filed** May 30, 1973, D.C., C.D. Calif. (Los Angeles), Doc. 73–1205–AAH, *Monogram Industries, Inc.* v. *Thetford Corporation.*

**3,575,196,** Marrese and O'Sullivan, CLOSED EXHAUST DISCHARGE SYSTEM FOR ANESTHESIA MACHINES, **filed** Jan. 20, 1972, D.C., N.D. Ill. (Chicago), Doc. 72c161, *Rocco Anthony Marrese and William T. O'Sullivan* v. *Richard's Medical Equipment Inc.* Final judgment against defendant, plaintiffs' patent invalid, action dismissed for want of equity, June 13, 1973. **Same, filed** Jan. 20, 1972, D.C., N.D. Ill. (Chicago), Doc. 72c162, *Rocco Anthony Marrese et al.* v. *Air Reduction Co.* Final judgment, plaintiffs' patent is invalid, has not been infringed, action dismissed, June 13, 1973.

**3,667,435,** R. M. Bygdnes, VEHICULAR ENGINE BRAKE ASSEMBLY, **filed** June 25, 1973, D.C., C.D. Calif. (Los Angeles), Doc. 73–1453–RJK, *Rocky Cycle Co., Inc. and Richard M. Bygdnes* v. *Ralph D. Milligan.*

**3,693,559,** R. H. Allen, POLLUTION CONTROL APPARATUS FOR COMBUSTIVE DISMANTLING, **filed** June 14, 1973, D.C., S.D. Ind. (Evansville), Doc. EV 73–C–47, *The David J. Joseph Company* v. *Evans Products Company et al.*

## Certificates of Correction for the Week of Jan. 29, 1974

| | | | |
|---|---|---|---|
| D. 227,854 | 3,728,940 | 3,745,605 | 3,755,526 |
| 3,559,819 | 3,729,206 | 3,745,868 | 3,755,533 |
| 3,604,659 | 3,729,630 | 3,746,096 | 3,755,613 |
| 3,627,160 | 3,729,824 | 3,746,136 | 3,756,267 |
| 3,640,940 | 3,730,250 | 3,746,170 | 3,756,648 |
| 3,664,204 | 3,730,945 | 3,747,127 | 3,757,086 |
| 3,673,222 | 3,731,271 | 3,748,175 | 3,757,227 |
| 3,680,295 | 3,731,820 | 3,748,569 | 3,757,418 |
| 3,689,577 | 3,733,834 | 3,748,617 | 3,757,710 |
| 3,694,151 | 3,736,124 | 3,749,771 | 3,759,006 |
| 3,694,681 | 3,736,244 | 3,751,066 | 3,760,727 |
| 3,704,861 | 3,737,721 | 3,751,260 | 3,760,882 |
| 3,705,337 | 3,738,749 | 3,751,600 | 3,760,968 |
| 3,706,821 | 3,740,245 | 3,751,719 | 3,761,579 |
| 3,708,969 | 3,740,348 | 3,751,788 | 3,761,691 |
| 3,715,205 | 3,740,589 | 3,752,639 | 3,761,721 |
| 3,715,757 | 3,740,824 | 3,753,683 | 3,761,950 |
| 3,718,746 | 3,741,854 | 3,753,746 | 3,762,029 |
| 3,718,878 | 3,741,983 | 3,753,804 | 3,762,203 |
| 3,720,095 | 3,742,759 | 3,754,012 | 3,762,289 |
| 3,722,690 | 3,743,268 | 3,754,152 | 3,762,800 |
| 3,723,465 | 3,743,496 | 3,754,153 | 3,764,799 |
| 3,723,830 | 3,744,489 | 3,754,313 | |
| 3,726,840 | 3,744,758 | 3,754,990 | |
| 3,726,919 | 3,744,776 | 3,755,495 | |

# PATENT EXAMINING CORPS

## WILLIAM FELDMAN, Acting Assistant Commissioner

## CONDITION OF PATENT APPLICATIONS AS OF JANUARY 5, 1974

| PATENT EXAMINING GROUPS | Actual Filing Date of Oldest New Case Awaiting Action |
|---|---|
| **CHEMICAL EXAMINING GROUPS** | |
| GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—M. STERMAN, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy: Metal Stock, Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices. | 1-02-73 |
| GENERAL ORGANIC CHEMISTRY, GROUP 120—I. MARCUS, Director. Heterocyclic, Amides; Alkaloids; Azo, Sulfur; Misc. Esters, Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides. | 9-25-73 |
| HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes. | 10-26-72 |
| COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—A. L. LEAVITT, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding, Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography. | 1-02-73 |
| SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—R. FRIEDMAN, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes. | 9-01-72 |
| **ELECTRICAL EXAMINING GROUPS** | |
| INDUSTRIAL ELECTRONICS PHYSICS AND RELATED ELEMENTS, GROUP 210—N. ANSHER, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales. | 5-30-73 |
| SPECIAL LAWS ADMINISTRATION, GROUP 220—R. L. CAMPBELL, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material | 9-18-72 |
| INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts. | 3-26-73 |
| RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—L. FORMAN, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food: Agitating, Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating. | 7-17-72 |
| ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—W. L. CARLSON, Director. Semi-Conductor and Space Discharge Systems and Devices, Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring | 1-15-73 |
| DESIGNS, GROUP 290—R. L. CAMPBELL, Director. Industrial Arts; Household, Personal and Fine Arts. | 4-11-72 |
| **MECHANICAL EXAMINING GROUPS** | |
| HANDLING AND TRANSPORTING MEDIA, GROUP 310—G. M. FORLENZA, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding, Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment. | 3-15-73 |
| MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—D. J. STOCKING, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus; Plastics Working Apparatus; Plastic Block and Earthenware Apparatus; Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking, Tools; Cutlery; Jacks. | 2-16-73 |
| AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—A. RUEGG, Director. Amusement and Exercising Devices, Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry, Jewelry; Surgery; Toiletry, Printing, Typewriters, Stationery; Information Dissemination | 3-02-73 |
| HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—M. M. NEWMAN, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing, Bearings; Clutches, Power Transmission; Fluid Handling and Control, Lubrication | 3-12-73 |
| MISCELLANEOUS CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—T. J. HICKEY, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors; Miscellaneous Hardware; Locks; Building Structures, Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports, Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes. Sewing Machines | 9-28-72 |

**Expiration of patents:** The patents within the range of numbers indicated below expire during January 1974, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents ..... Numbers 2,775,762 to 2,779,941, inclusive
Plant Patents ..... Numbers 1,543 to 1,558, inclusive

# REISSUES

JANUARY 29, 1974

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

## 27,901

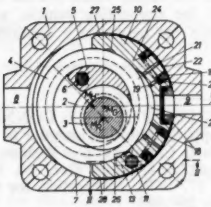
## WEAR COMPENSATING HIGH-PRESSURE GEAR PUMP

Otto Eckerle, Am Bergwald 3, 75 Malsch, Germany

Original No. 3,525,580, dated Aug. 25, 1970, Ser. No. 756,160, Aug. 29, 1968. Application for reissue Feb. 2, 1973, Ser. No. 329,181

Claims priority, application Germany, Sept. 1, 1967, P 16 53 826.4

Int. Cl. F01c *1/10*; F03c *3/00*; F04c *1/06*
U.S. Cl. 418—71 15 Claims



Wear [and-tear-] compensating high-pressure gear pump comprising a driven externally-geared pinion, a concomitantly rotating internally-geared [wheel] *ring*, a [movable] *pivotable* sickle-shaped filler member between the pinion and the internal gear *ring* and [either one or] two axial disks covering the gears laterally, as well as an insert member, called "control piston" being disposed on the pressure side of the gears and being radially displaceably arranged with respect thereto, enclosing the outer circumferential surface of the internal gear *ring* in a specific angular range and [touching] *positioning* the latter [as the sole stator part], said control piston containing the first portion of the [pressure] *fluid* outlet duct, *the control piston being* [relieved for the major part with regard to radial forces] *subjected to a radial pressure compensation field* and hence pressing against the circumference of the internal gear *ring* with only a limited amount of excess force so that as a result the internal gear *ring* is essentially supported only on the pinion, on the one hand, and on the filler member, on the other hand [characterized in that] the pump housing [(1) is] *being* eccentrically bored with respect to the pinion shaft [(3)] in such a manner that the center [($M_G$)] of the housing bore [(7)] is positioned on the [hydraulic line of application or effective curve ($W_L$) which extends of necessity also through the internal gear center ($M_H$)] *center line of radial hydraulic thrust on the internal gear ring*, and [in that] the control piston [(10) is] *being* accommodated in the [sickle-shaped] space being formed [due to the eccentricity] between the internal gear [(4)] *ring* and the housing bore [(7), being essentially adapted to the configuration thereof].

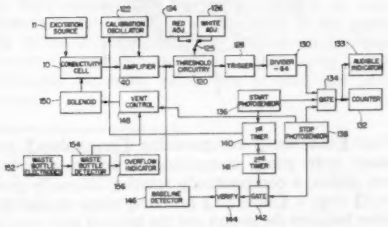
## 27,902

## PARTICLE COUNTING SYSTEM

Weems E. Estelle, Southport, Henry R. Angel, Trumbull, and Pasquale M. Petrucci, Orange, Conn., assignors to General Science Corp., Bridgeport, Conn.

Original No. 3,657,725, dated Apr. 18, 1972, Ser. No. 32,582, Apr. 28, 1970. Application for reissue Feb. 16, 1973, Ser. No. 332,911

Int. Cl. G06m *11/04*
U.S. Cl. 235—92 PC 24 Claims



A particle counting system especially adapted for blood cell counting and which is essentially automatic in operation. The system includes an easily replaceable conductivity cell and electro-optical metering of a predetermined volume of sample fluid and also includes calibration and self-checking circuitry to enable reliable and accurate analysis.

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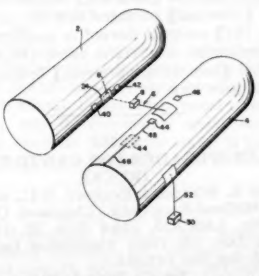
## 27,903

## SPACE DELIVERY SYSTEM

Charles P. Fogarty, Box 254, Commack, N.Y. 11725

Original No. 3,478,986, dated Nov. 18, 1969, Ser. No. 691,107, Dec. 6, 1967, which is a continuation-in-part of abandoned Ser. No. 487,194, Sept. 14, 1965. Application for reissue Apr. 5, 1971, Ser. No. 131,044

Int. Cl. B64g *1/10*
U.S. Cl. 244—1 SD 24 Claims



The present disclosure relates to a space delivery system for delivering items between space vehicles or for

coupling space vehicles. The device involves a flexible extensible cable fed from a reel and through which is delivered gas to the front of the cable where it is directed backwardly to propel the front end of the cable forwardly.

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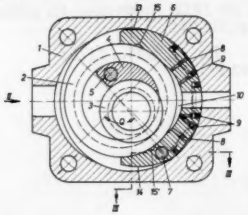
**27,904**
**WEAR COMPENSATING HIGH-PRESSURE GEAR PUMP**
**Otto Eckerle, Am Bergwald 3, 75 Malsch, Germany**
**Original No. 3,525,581, dated Aug. 25, 1970, Ser. No. 756,169, Aug. 29, 1968. Application for reissue Feb. 2, 1973, Ser. No. 329,109**
**Claims priority, application Germany, Sept. 1, 1967, P 16 53 827.5**
**Int. Cl. F01c *1/10*; F03c *3/00*; F04c *1/06***
**U.S. Cl. 418—71** **12 Claims**



Wear [and tear-] compensating [heavy-duty] *high-pressure* gear pump comprising a driven externally-geared pinion, a concomitantly rotating internally-geared [wheel] *ring*, a [movable] *pivotable* sickle-shaped filler member between the pinion and the internal gear *ring*, and [either one or] two axial disks laterally covering the gears, as well as [an insert member called] *a* "control piston" being disposed on the pressure side of the gears and radially displaceably arranged with respect thereto, enclosing the outer circumferential surface of the internal gear *ring* within a specific angular range and [touching] *positioning* the latter [as the sole stator part], said control piston containing the first portion of the [pressure] *fluid* outlet duct, *the control piston* being [relieved for the major part with respect to radial forces] *subjected to a radial pressure compensation field* and hence pressing against the circumference of the internal gear *ring* with [only] a limited [excess] force, characterized in that the control piston [(6)] is [rotatably but not displaceably] *pivotably arranged inside the housing, the pivot point being* positioned in proximity to the tooth engagement of the two gears [(2, 3)] *and* that the [center of rotation] *pivot point* is disposed outside of the [relieving] *pressure compensation* field [(12) being under pressure] between the internal gear *ring* [(2)] and the control piston, and in that the [relieving] *pressure compensation* field is so [provided] *arranged* that the surface [center of gravity (S)] *centroid* thereof is positioned above the [line of application or effective curve ($W_L$)] *center line* of the radial [compensating forces] *hydraulic thrust on the internal gear ring.*

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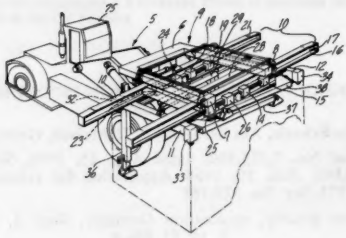
**27,905**
**GRAPPLER-SPREADER FOR CANTILEVER-BOOM TRUCKS**
**Donald R. Whiteman, Roxboro, N.C., assignor to Midland-Ross Corp., Cleveland, Ohio**
**Original No. 3,606,053, dated Sept. 20, 1971, Ser. No. 884,986, Dec. 15, 1969. Application for reissue Apr. 12, 1972, Ser. No. 243,484**
**Int. Cl. B66c *1/30***
**U.S. Cl. 214—147 G** **11 Claims**

An expandable spreader and grappling device, termed herein a grappler-spreader, for top-lifting cargo containers and bottom-lifting containers, piggy-back trailers, etc. particularly adapted for use on large front or side lift trucks or other vehicles which provide a centilever-type lifting boom. For bottom-lifting, the device necessarily has grappling arms which are retractable in order that the top-lifting mechanism may be used more effectively. In the present instance, the arms, which are on the side of the spreader toward the supporting vehicle, are shortenable to a length within the height of a container.



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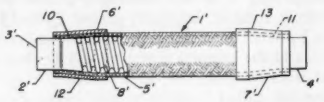
**27,906**
**REINFORCED FLEXIBLE CONNECTOR**
**George G. Toepper, Elgin, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.**
**Original No. 3,627,354, dated Dec. 14, 1971, Ser. No. 23,354, Mar. 27, 1970. Application for reissue May 4, 1972, Ser. No. 250,452**
**Int. Cl. F16l *9/14***
**U.S. Cl. 285—55** **7 Claims**



A flexible connector and the method of fabricating the same. The connector includes a tubular member having a central corrugated portion and uncorrugated end portions. A sleeve of braided strands is disposed around the tubular member to encompass the corrugated central portion and overlap at least a part of the uncorrugated end portions of the tubular member. A collar is disposed in a force-fit manner around each end of the sleeve to overlap the part covering an uncorrugated end portion to thus secure the sleeve in place and provide reinforcement for the corrugated portion of the tubular member.

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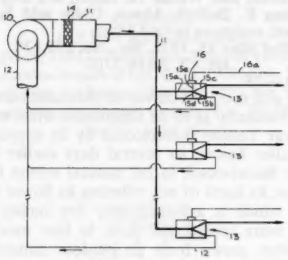
**27,907**
**APPARATUS FOR AIR-CONDITIONING SYSTEMS**
**Gene W. Osheroff, Las Vegas, Nev., assignor to Fluidtech Corporation, Inglewood, Calif.**
**Original No. 3,563,306, dated Feb. 16, 1971, Ser. No. 864,931, Sept. 15, 1969, which is a continuation-in-part of abandoned Ser. No. 801,930, Feb. 20, 1969, which in turn is a continuation-in-part of abandoned Ser. No. 640,578, May 23, 1967. Application for reissue Oct. 27, 1972, Ser. No. 301,599**
**Int. Cl. F24f *3/00***
**U.S. Cl. 165—22** **12 Claims**

The present invention concerns the application of fluidic devices to air-conditioning systems. More specifically, the

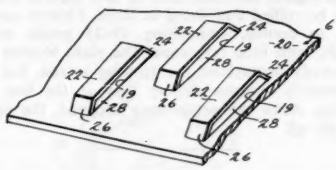
present invention encompasses the use of fluidic valves by means of which heating and cooling can be controlled without moving parts being involved. Through the use of such devices, throttling as a means for controlling flow is eliminated altogether and the control of multi-zone air conditioning is rendered more feasible.



27,908
**FLUID CONTACT TRAY**

**Irvin Earl Nutter, deceased, late of Tulsa, Okla., by The First National Bank and Trust Co., executor, and Dale E. Nutter, Tulsa, Okla., assignors to Martha C. Nutter, Tulsa, Okla., and Nancy N. Pantaleoni, Tenafly, N.J., fractional part interest to each**

**Original No. 3,463,464, dated Aug. 26, 1969, Ser. No. 670,681, Sept. 26, 1967, which is a continuation-in-part of abandoned Ser. No. 360,494, Apr. 17, 1964. Application for reissue July 26, 1971, Ser. No. 166,323**
**Int. Cl. B01d** *3/24*
**U.S. Cl. 261—114 R** **10 Claims**



A fluid contact tray having a plurality of tapering apertures therein, the major dimension of the apertures lying in the direction of liquid flow across the tray. A deflector is supported above each aperture by a pair of transversely extending baffles one at each end of each aperture.

# PLANT PATENTS

## GRANTED JANUARY 29, 1974

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

3,453
**APPLE TREE**

**John Gould Hannaford, Mount Bera, Cudlee Creek, South Australia, Australia, assignor to Granny Spur Enterprises, Orondo, Wash.**

**Filed Mar. 1, 1972, Ser. No. 231,034**
**Int. Cl. A01h** *5/03*
**U.S. Cl. Plt.—34** **1 Claim**

Originating as a genetic bud sport on a standard Granny Smith apple tree in the present discoverer's orchard at Mount Bera, Cudlee Creek, South Australia, this new Granny Smith mutation exhibits vigorous spur-type growth with foliage that is deep green and dense and fruit that is deeper green than that of the parent.

3,454
**CHRYSANTHEMUM PLANT**

**Grace H. Mack, 108 Wahackme Road, New Canaan, Conn. 06840, and Walter H. Jessel, Jr., Doylestown, and William E. Duffett, Akron, Ohio; said Jessel and said Duffett assignors to said Mack, New Canaan, Conn.**

**Filed May 15, 1972, Ser. No. 253,641**
**Int. Cl. A01h** *5/00*
**U.S. Cl. Plt.—75** **1 Claim**

1. A new and distinct cultivar of chrysanthemum characterized particularly as to its uniqueness when compared with the garden cultivar Early Gold by its flowers which are approximately ¼" larger; its stronger stems; its incurved individual petals with a longitudinal petal roll, thereby providing a more solid flower and a more formal flower form; its approximately six days longer keeping quality in the fall garden; its lighter gold flower color; its taller, more spreading habit with slightly more prolific branching in the fall garden, less leaf serration, and more prominent stipules.

3,455
**CHRYSANTHEMUM PLANT**

**Barrie J. Machin, Chichester, and G. B. Hall, Ashley Green, Chesham, England, assignors to Yoder Brothers, Inc., Barberton, Ohio**

**Filed May 12, 1972, Ser. No. 252,949**
**Int. Cl. A01h** *5/00*
**U.S. Cl. Plt.—74** **1 Claim**

1. A new and distinct cultivar of chrysanthemum characterized particularly as to its uniqueness when compared to the cultivar Pink Marble by its aproximately one-quarter inch larger flower, its very flat symmetrically petalled flowers which have no twisting or reflexing of the petals, its rose pink flower color, and approximately two inches more vigor.

3,456
**RHUBARB PLANT**

**Harold B. Whitmore, 223 Walnut Lane NW., Vienna, Va. 22180**

**Filed Apr. 25, 1972, Ser. No. 247,340**
**Int. Cl. A01h** *5/00*
**U.S. Cl. Plt.—89** **1 Claim**

1. A new and distinct variety of rhubarb plant of the type having relatively red stalks, particularly characterized by its unique disease-resistant ability to flourish in relatively southern climes; its relatively sweet taste; its rapid growth habit, and its continuous season-long harvest which permits succulent edible new stalks to be harvested continuously from spring until frost.

3,457
**ROSE PLANT**

**David L. Armstrong, Upland, Calif., assignor to Armstrong Nurseries, Inc., Ontario, Calif.**

**Filed Apr. 19, 1972, Ser. No. 245,669**
**Int. Cl. A01h** *5/00*
**U.S. Cl. Plt.—28** **1 Claim**

An asexually reproduced bush rose of the floribunda class particularly characterized in the color stability of

the bright reddish orange petals of the bloom, which undergo little or no change in coloration or shade from first opening to late maturity, although flowers blooming in cool gray weather may be somewhat darker in shade throughout their life.

The plant is moderately low growing and moderately spreading in habit, carrying most of its flowers in small irregular clusters with strong peduncles on short to medium stems.

Only occasionally do the sepals have foliaceous parts extending beyond the bud. The buds are small, but the bloom appears to grow in size until the flower is fully open, at slightly less than three or four inches. The petals tend to be ruffled and fluted in form. Flowers are semi-double to double, comprising 19–25 petals and 2–8 petaloids, with little fragrance. The plant blooms almost continuously throughout the growing season, but makes a moderately massive display only at the first Spring blooming. After the petals have dropped, the peduncle also falls off.

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**3,458**
**CHRYSANTHEMUM PLANT**
**Walter H. Jessel, Jr., Doylestown, and William E. Duffett, Akron, Ohio, assignors to Yoder Brothers, Inc., Barberton, Ohio**
**Filed Apr. 24, 1972, Ser. No. 247,193**
**Int. Cl. A01h** *5/00*

**U.S. Cl. Plt.—78** **1 Claim**

1. A new and distinct cultivar of chrysanthemum characterized particularly as to uniqueness when compared to the parent cultivar Mountain Snow by its yellow flower color, and being unique relative to the cultivar Mountain Sun by its ¼"–1¼" larger flowers, 10–15% more petals which are approximately 5/16" broader in width, approximately ¾" longer leaves, by its approximately 2"–3" taller habit and 1" less spread as a pinched plant, by its somewhat earlier response, and by its more incurved flower form.

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**3,459**
**CHRYSANTHEMUM PLANT**
**Philip W. Holmquist, 4045 Highway 101, Hamel, Minn. 55340, and Walter H. Jessel, Jr., Doylestown, and William E. Duffett, Akron, Ohio; said Jessel and said Duffett assignors to said Holmquist**
**Filed June 5, 1972, Ser. No. 259,996**
**Int. Cl. A01h** *5/00*

**U.S. Cl. Plt.—74** **1 Claim**

1. A new and distinct cultivar of chrysanthemum characterized particularly as to its uniqueness when compared to the parent cultivar Nimbus and to the cultivar Nimrod by its yellow flower color.

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**3,460**
**CHRYSANTHEMUM PLANT**
**Grace H. Mack, 108 Wahackne Road, New Canaan, Conn. 06840, and Walter H. Jessel, Jr., Doylestown, and William E. Duffett, Akron, Ohio; said Jessel and said Duffett, assignors to said Mack**
**Filed May 15, 1972, Ser. No. 253,638**
**Int. Cl. A01h** *5/00*

**U.S. Cl. Plt.—75** **1 Claim**

1. A new and distinct cultivar of chrysanthemum characterized particularly as to its uniqueness when compared to the cultivar Yellow Butterscotch by its approximately ¼ inch smaller flower; its several days earlier response than Yellow Butterscotch in fall natural season flowering in the garden; its habit of not reflexing its flower form; its plant habit which is approximately five inches shorter, nine inches more spread and three to four more breaks per plant when grown from an outdoor natural season flowering, planted in mid-June and given a single pinch, and by its darker flower color.

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**3,461**
**GLADIOLUS PLANT**
**John R. Larus, West Hartford, and Charles T. Larus, Avon, Conn., assignors to Selected Glads, Inc., New Albany, Ind.**
**Filed Nov. 19, 1971, Ser. No. 200,623**
**Int. Cl. A01h** *5/00*

**U.S. Cl. Plt.—85** **1 Claim**

1. A new and distinct variety of gladiolus plant, substantially as herein shown and described, characterized particularly as to novelty by the unique combination of its deep pink color, and its ability to open up to twelve florets at a time.

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**3,462**
**AZALEA PLANT**
**Raymond Yoshimura, San Gabriel, Calif., assignor to San Gabriel Nursery and Florist, San Gabriel, Calif.**
**Filed Mar. 27, 1972, Ser. No. 238,702**
**Int. Cl. A01h** *5/00*

**U.S. Cl. Plt.—57** **1 Claim**

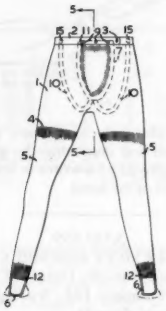
1. The new and distinct variety of azalea plant substantially as herein shown and described, characterized particularly as to novelty by the slightly double, campanulate, substantially Orient red blooms borne in profusion during the winter and spring months, there being many blooms on a stem, by its flowering habit that extends throughout a substantial portion of the year, and by its vigorous upright growth habit.

# PATENTS

## GRANTED JANUARY 29, 1974

## GENERAL AND MECHANICAL

**3,787,892**
**ICE HOCKEY GARMENT**
**Peter H. Quinn, 1101-C Falaise Rd., Ottawa, Ontario, Canada**
**Continuation-in-part of Ser. No. 13,939, Feb. 25, 1970, abandoned. This application Mar. 13, 1972, Ser. No. 233,897**
**Claims priority, application Canada, Feb. 25, 1969, 043901**
**Int. Cl. A41d** *13/00*
**U.S. Cl. 2—2** **7 Claims**



The present invention relates to a unitary hockey garment comprising a body portion adapted to snugly fit around the trunk of the body of the wearer from about the waist downwards said body portion including a portion adapted to grip the trunk of the body of the wearer forming an undergarment portion and a pair of leg portions, each leg portion extending from said body portion and having means at the free end thereof for gripping the foot of the wearer to maintain the leg portion under tension on the leg of the wearer forming an outer garment portion and detachable retaining means for releasably retaining a protective cup or plate in said crotch area, said leg portion including a pocket dimensioned for removable accommodation of a shin pad and disposed for location of the shin pad opposite the shin of the wearer.

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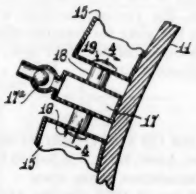
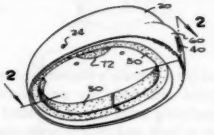
**3,787,893**
**PROTECTIVE HEADGEAR**
**Angelo C. Larcher, 8036 S. Western Ave., Chicago, Ill.**
**Filed May 4, 1972, Ser. No. 250,173**
**Int. Cl. A42b** *3/00*
**U.S. Cl. 2—3 R** **2 Claims**



Protective headgear including a hard shell and a plurality of inflated fluid chambers on the outside surface of said shell. Fluid delivery means is connected to each chamber and valve means in said chambers prevents reverse flow of fluid.

**3,787,894**
**EASILY ADJUSTABLE PROTECTIVE HEAD GEAR**
**James W. Goodman, Jr., Box 321, Kilmarnock, Va.**
**Filed Oct. 12, 1972, Ser. No. 297,047**
**Int. Cl. A42b** *3/00*
**U.S. Cl. 2—3 A** **2 Claims**



A protective helmet is dislosed in the form of a batting helmet comprising a shell formed of tough impact resistant plastic material with a flexible metal headband positioned in the shell interior with the ends of the band being connected to a threaded rod operable by rotation of a knurled knob positioned on the interior of a protrusion of the shell but externally accessible for manual rotation while the device is in place on the head of a wearer to accommodate the head size of the wearer; a band of foam rubber extends about the inner surface of the metal band and a crown cushion of foam rubber is positioned in the top of the shell; in a second embodiment, the knurled adjusting knob is positioned in a metal protrusion affixed to the exterior of the plastic shell as opposed to a unitary protrusion and shell construction of the first embodiment.

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**3,787,895**
**PROTECTIVE FACE MASK AND PADDING MATERIAL THEREFOR**
**Paul C. Belvedere, 2105 W. 61st St., Minneapolis, Minn.**
**Filed July 21, 1972, Ser. No. 273,364**
**Int. Cl. A41d** *13/00*
**U.S. Cl. 2—9** **21 Claims**

A protective face mask consisting of a soft, resilient inner member conforming in shape to a user's mouth and chin, and an outer member of hard, impact resistant material which is sized and shaped to fit over the user's mouth and mechanically secured to the inner member. The inner and outer members are constructed and arranged to define a plurality of cavities between them when secured together, and the thickness of the inner member permits it to deform resiliently in the area of the cavities when subjected to impact forces.

3,787,896

## FRONT PLACKET FOR FEMALE'S BLOUSE

George Weiss, 520 Magnola Blvd., Long Beach, N.Y.

Filed Aug. 25, 1972, Ser. No. 283,940
Int. Cl. A41b *1/20*
U.S. Cl. 2—106 1 Claim

A front placket for a female's blouse having an outer fabric covering supported internally by an interlining strip, and wherein said interlining strip has (a) folded under marginal edges to increase its bulk and thus provide support to the corresponding marginal edges of the fabric covering so as to minimize wrinkling therein and (b) is oriented on the bias, i.e., the yarns thereof are aligned at a 45° angle to the placket length, so that despite the aforesaid increased marginal bulk of the interlining it does not inhibit flexing or draping of the placket, as is required to achieve proper fit of the garment.

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3,787,897

## GLOVE OR MITTEN WITH COLORED MESH BACKING

David A. Sabin, 234 W. Main, and Mark A. Sabin, 116 W. Walnut, both of Manly, Iowa

Filed Nov. 13, 1972, Ser. No. 305,966
Int. Cl. A41d *19/00*
U.S. Cl. 2—158 2 Claims

A hand covering, such as a workman's glove or mitten having a front portion of wear-resistant leather-like material for covering the palm, thumb and front surfaces of the fingers and wrist of a wearer, and a back portion for covering the back of the hand and fingers of the wearer. The back portion is of mono-filament material loosely woven or interlaced to provide open spaces for free movement of air therethrough, whereby the interior of the covering is effectively ventilated. The monofilament material is colored with high light-reflective coloring matter, and the back portion is formed to provide spaced ridges so that light is reflected at various angles from the back portion.

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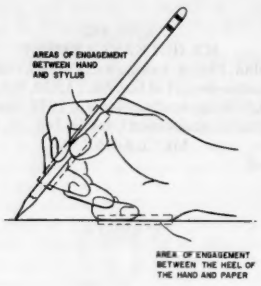
3,787,898

## WRITING FACILITATING GLOVE

Charles F. Walker, 7047 Lincoln Dr., Philadelphia, Pa.

Filed Oct. 12, 1972, Ser. No. 296,845
Int. Cl. A41d *19/00*
U.S. Cl. 2—163 6 Claims

A writing glove to facilitate the movement of a hand of a writer in the operation of writing with a pen on a writing surface includes an elongated smooth surface area on the glove, which smooth surface area has a low coefficient of friction and constitutes the area of contact between the glove and the writing surface, and selectively shaped and located adhesive areas




on portions of the glove,which adhesive areas have a high coefficient of friction and constitute the gripping areas that are substantially employed by a writer in holding a pen during the writing movement of the hand.

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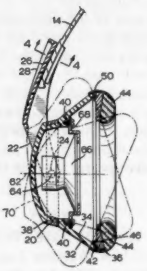
3,787,899

## EAR MUFF ASSEMBLY

Alois Albin Krawagna, Toronto, Ontario, Canada, assignor to Imperial Optical Company Ltd., trading as Safety Supply Co., Toronto, Ontario, Canada

Filed July 11, 1972, Ser. No. 270,605
Int. Cl. A41d *21/00*
U.S. Cl. 2—209 3 Claims




An ear muff assembly for use with a headband including an ear cup, a circumferentially extending first bearing, the ear cup being mounted in the first bearing for rotation about a first axis, a yoke, the circumferentially extending bearing being mounted in the yoke for rotation about a second axis which extends laterally of the first axis, the yoke being mountable on the headband.

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3,787,900

## ARTIFICIAL BONE OR TOOTH PROSTHESIS MATERIAL

Thomas D. McGee, Ames, Iowa, assignor to Iowa State University Research Foundation, Ames, Iowa

Filed June 9, 1971, Ser. No. 151,580
Int. Cl. A61c *13/08*; A61f *1/00*; C09k *3/00*
U.S. Cl. 3—1 11 Claims

A prosthesis material useful for artificial bones or teeth is provided in the form of a heat-consolidated body composed essentially of a dense structurally integrated mixture of discrete microcrystals of a calcium phosphate compound

together with discrete microcrystals of a refractory compound, such as the mineral spinel, aluminum phosphate, or aluminum oxide. The preferred calcium phosphate compound is whitlockite, but it can be used in combination with other more soluble calcium phosphate compounds.

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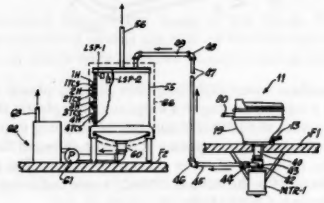
**3,787,901**

## TOILET AND WASTE STORAGE SYSTEM

**Robert F. Wagner, Lombard; Edward J. Kubiak, Oakbrook, and Edward J. Rollo, Jr., Des Plaines, all of Ill., assignors to General American Transportation Corporation, Chicago, Ill.**

**Filed July 20, 1971, Ser. No. 164,261**
**Int. Cl. E03d** *1/00*
**U.S. Cl. 4—10** **21 Claims**



A system, that receives and treats human body waste added to a toilet, includes a toilet bowl with a bottom outlet, a storage tank, a heater for the tank to evaporate water from and thereby reduce volume of waste in the tank, a conduit communicating with the bowl outlet, a valve closing and opening that communication, means to open the valve, means to close the valve, transfer means between the conduit and the tank, and valved conduit means to provide a predetermined amount of flush water upon opening of the valve between the bowl outlet and the conduit. The transfer means is operative for a predetermined period of time after closing of the valve between the outlet and the conduit. The heater is operative when waste in the tank rises to a predetermined level and thereafter until solids content in the waste reaches a predetermined value. Operation of the transfer means is prevented when the level of waste in the tank exceeds a higher level. Flush water may be added to the bowl without opening the valve between the bowl outlet and the conduit.

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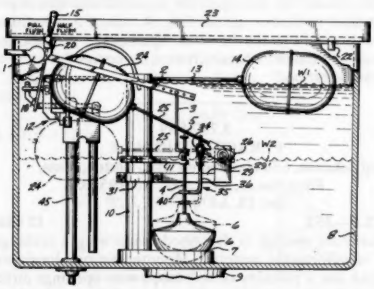
**3,787,902**

## FLUSH TANK WATER-REGULATING ATTACHMENT

**Jay McCombs, Nordland, Wash.**

**Filed Dec. 6, 1971, Ser. No. 204,903**
**Int. Cl. E03d** *1/34, 5/02, 5/10*
**U.S. Cl. 4—67 A** **2 Claims**



The volume of water supplied to flush a toilet bowl is selected by setting a handle mounted externally on a flush tank, which handle swings a support lever between a nonlimiting position and a position for limiting downward travel of an auxiliary float. A float-actuated lever carries adjacent to its pivot a link for engaging the flush tank discharge valve to limit upward travel of such valve. The valve thereby remains close to its valve seat so that the valve is closed more quickly by pressure of the water on its upper surface and suction created by water flowing through the valve port, thereby substantially reducing the volume of water supplied to the bowl.

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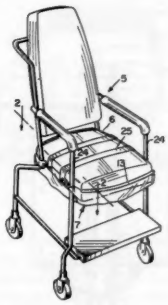
**3,787,903**

## URINE SHIELD

**Marjorie A. Miller, Rt. 2, Box 414 A, Sleepy Hollow Rd., Dundee, Ill.**

**Filed Oct. 26, 1972, Ser. No. 300,900**
**Int. Cl. A47k** *11/04, 11/06;* **A61g** *7/04*
**U.S. Cl. 4—134** **6 Claims**



An inconspicuous urine collection shield for fitting underneath and around the sides of an upholstered or cushioned seat of a chair. When the chair is occupied by a person who has lost normal bladder control, the urine can run down any or all four sides of the chair seat and collect in the portion of the shield which fits underneath the seat. Suitable fastening means are provided for removably securing the shield in place so that it can be partially removed for draining or completely removed for cleaning purposes. If desired the shield may be provided with a tubular attachment for connection to an indwelling catheter. A simple drain tube may be attached to the shield so that urine collected therein may be drained from time to time without releasing and lowering any portion of the shield.

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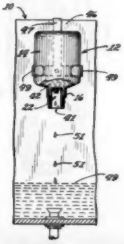
**3,787,904**

## LIQUID DISPENSING AND METERING DEVICE

**Nathan B. Lerner, Chicago, Ill., assignor to W. Braun Company, Chicago, Ill.**

**Filed Sept. 27, 1971, Ser. No. 184,022**
**Int. Cl. E03d** *9/03*
**U.S. Cl. 4—227** **1 Claim**



A liquid dispensing and metering device for automatically and periodically dispensing a predetermined quantity of liquid

into a flush tank or the like, which device comprises an integrally formed member having a wall within the neck or discharge opening of the container so that the device does not extend outwardly beyond the neck or discharge opening of the container so as to minimize the overall height of the container, and in which the outlet or discharge end may be covered by a closure cap, said device having an opening in the wall thereof through which the liquid in the container is dispensed in measured amounts.

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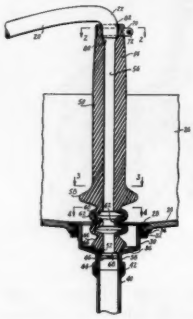
**3,787,905**
**RUBBER PLUMBER**
**Joseph H. Curzon, 8103-14th Ave., Adelphi, Md.**
**Filed Apr. 20, 1971, Ser. No. 135,653**
**Int. Cl. E03c** *1/306*
**U.S. Cl. 4—256** **4 Claims**



A molded element having a resilient portion and a tapered end and an outward extending flange adjacent opposite ends of the resilient portion for pressedly connecting a sink faucet with a drain pipe in fluid communication.

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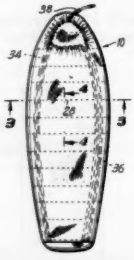
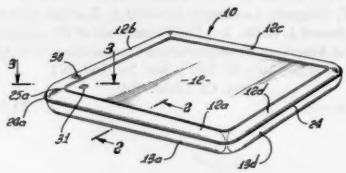
**3,787,906**
**SLEEPING BAG CONSTRUCTION**
**Harry Hunt, 107 N. Walnut St., Ridgewood, N.J.**
**Filed Dec. 9, 1971, Ser. No. 206,345**
**Int. Cl. A47g** *9/00*
**U.S. Cl. 5—343** **10 Claims**



Mummy-type insulated sleeping bag, particularly for Winter, Alpine and other severe weather, providing unusual loft and warmth with minimal weight, elimination of coldspots and suitable for use in an emergency by two persons.

**3,787,907**
**FRAMELESS WATER BED**
**William Pennington, and William Pennington, III, both of 30200 Oceanaire Dr., Palos Verdes, Calif.**
**Filed Jan. 28, 1972, Ser. No. 221,589**
**Int. Cl. A67c** *27/08*
**U.S. Cl. 5—348 WB** **8 Claims**



A frameless water bed comprises primary plastic sheeting forming a tube extending in a loop, auxiliary plastic sheets extending across the loop interior and overlapping opposite extents of the tube for retaining it against outward deflection under the influence of water pressure exertion. The auxiliary sheets form with the tube a closed, water receiving interior hollow bounded by the tube.

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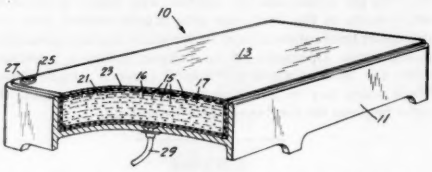
**3,787,908**
**INCOMPRESSIBLE, CONFORMABLE STRUCTURE CONTAINING CELLULAR PARTICLES**
**Warren R. Beck, Saint Paul, and Norman P. Sweeny, North Oaks, both of Minn., assignors to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.**
**Filed July 1, 1971, Ser. No. 158,889**
**Int. Cl. A47c** *27/08*
**U.S. Cl. 5—348 WB** **13 Claims**



The disclosed cushioning means comprises a flexible-walled container filled with a flowable liquid and, suspended in the liquid, tiny cellular particles having a low density. The cellular particles reduce the density of the liquid fill and also improve its thermal insulative properties. A viscosity modifier is preferably added to the flowable liquid fill to provide better dimensional stability characteristics, as compared to a conventional water bed.

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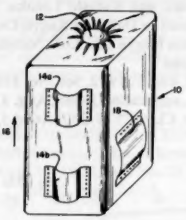
**3,787,909**
**FURNITURE MODULE**
**Edward Johnson, 650 Huntington Ave., Boston, Mass.**
**Filed Nov. 3, 1971, Ser. No. 195,100**
**Int. Cl. A47c** *17/40, 7/20*
**U.S. Cl. 5—352** **10 Claims**

A furniture module is described comprising a rectangular block of deformable material. Mounted on one long side of the block are a plurality of belt loops with openings directed substantially along the long dimension of the block. At least one additional belt loop is mounted on an adjacent long side of the block with its opening substantially perpendicular to the long dimension of the block. Included with the module is a

flexible elongated belt having a length at least equal to the longest periphery of the block, and dimensioned so as to allow it



to be threaded through the loops on the block. Fastening means are provided so that the ends of the belt can be joined together, or two or more belts can be joined end-to-end.

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**3,787,910**

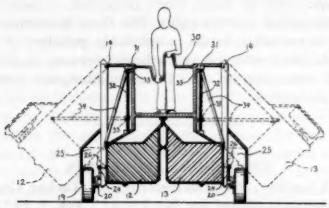
**AMPHIBIOUS VEHICLE**

**James F. Taylor, Raleigh, N.C., assignor to Design Dimension, Inc., Raleigh, N.C.**

**Filed May 18, 1972, Ser. No. 254,713**

**Int. Cl. B60f** *3/00*; **B63c** *13/00*

**U.S. Cl. 9—1 T** **7 Claims**



In abstract, a preferred embodiment of this invention is a towable, land type vehicle which is launchable and expansible for use as a stable watercraft with roomy, trailer-like accommodations.

Basically the body of the vehicle comprises a central section having expandable wing sections disposed on each side thereof. Each wing section has a retractable wheel assembly incorporated therein. A retractable tow bar is provided about the front of the body which enables the tow bar to be moved inwardly relative to the body when the amphibious vehicle is used as a watercraft.

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**3,787,911**

**NESTABLE BOAT ON A KNOCK DOWN PLAN**

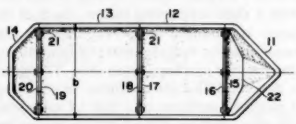
**Masami Miya, Tokyo, Japan, assignor to Nepon Kabushiki Kaisha, Tokyo, Japan**

**Filed Nov. 22, 1972, Ser. No. 308,901**

**Claims priority, application Japan, Dec. 22, 1971, 46-120630**

**Int. Cl. B63b** *7/04*

**U.S. Cl. 9—2 S** **1 Claim**



A nestable boat on a knock down plan comprising a bow, a minor body, a major body and a stern. These four members are individually floatable. The bow is juxtaposed with the stern and is adapted to be nested inside the minor body when the common axial line of the bow and the stern is arranged at an angle of 45° to the axial line of the minor body adapted to be nested inside the major body when the axial line of the former is arranged at a right angle to the axial line of the latter, and therefore, the telescoped boat is compact enough for transportation and storage.

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**3,787,912**

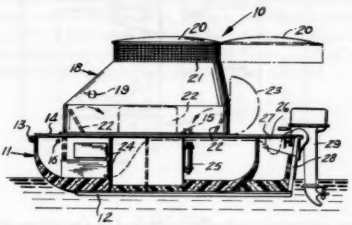
**FLOATING HUNTING BLIND**

**Stanton E. Huey, Jr., 2128 Maywood Dr., Monroe, La.**

**Filed Sept. 21, 1972, Ser. No. 291,048**

**Int. Cl. B63b** *35/00*

**U.S. Cl. 9—5** **1 Claim**



A one man containing hunting blind. This device consists primarily of a floating device with protective compartment means for a single hunter, the device including transom means for an outboard engine, the hull portion having compartment means for gas tanks, fire extinguisher and other necessary items for a hunter.

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**3,787,913**

**METHOD FOR MANUFACTURING WASHERS FROM A FLEXIBLE TUBE**

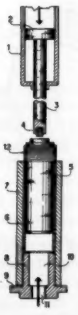
**Bernard Le Comte, Houilles; Jules Henry, Hillion, and Roger Pincemin, Ploufragan, all of France, assignors to Le Joint Francais, Paris, France**

**Filed June 23, 1972, Ser. No. 265,886**

**Claims priority, application France, June 24, 1971, 71.23095**

**Int. Cl. B21d** *53/20*; **B23p** *19/04*

**U.S. Cl. 10—86 B** **4 Claims**



A method for manufacturing washers from a flexible tube consisting in engaging a tube on a mandrel, cutting up the tube into washers and withdrawing the washers produced from the mandrel, is characterized in that the engaging of a new tube to

be cut up is effected on the mandrel bearing the washers produced from the previously cut-up tube, the relative movement of that new tube on the mandrel simultaneously causing the removal of the washers borne by that mandrel.

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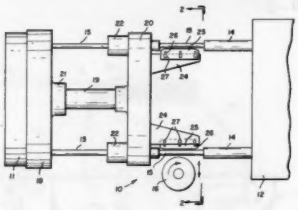
**3,787,914**

## BAR EXCURSION CONTROLLER

**Paul T. Heanue, Fayetteville, N.Y., assignor to Lipe Rollway Corporation, Syracuse, N.Y.**

**Filed Oct. 12, 1972, Ser. No. 296,807**
**Int. Cl. B21h** *27/02*
**U.S. Cl. 10—162 S** **10 Claims**



A bar excursion controller is applied to a multispindle screw machine having a bar feeder that uses a driven roller with spring-loaded flanges for straddling, squeezing and feeding the bars in time with the machine. The excursion controller is built on a base plate that is mounted concentric with the stock reel for indexing with the stock reel, and it carries a back-up plate for each bar of the machine. The back-up plates are mounted adjacent the bars and opposite the driven roller and are radially adjustable for normally clearing the bars by the amount of acceptable off-axis movement for the bars.

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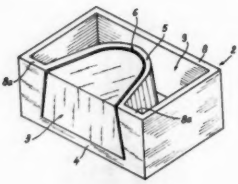
**3,787,915**

## DEVICE FOR MOUNTING THE TOE AND HEEL ENDS OF A SHOE UPPER

**Terence Albert Holt, and Jean-Gabriel Barre, both of Lyon, France, assignors to Centre Technique du Cuir, Lyon, France**

**Filed Nov. 17, 1972, Ser. No. 307,558**
**Int. Cl. A43d** *21/12*
**U.S. Cl. 12—8.1** **5 Claims**



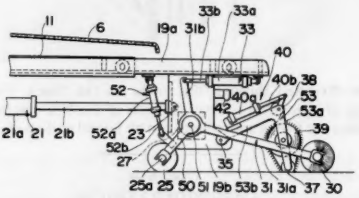
The toe and heel ends of the mounting last, in a shoe-making process, act as forming elements in the shaping of the upper in combination with a die comprising impressions of the shoe to be obtained. This die comprises on the one hand a frame element of semi-rigid but resilient material which includes a base carrying at least one curved rib corresponding substantially to the outer contour of the toe end of the shoe contemplated and on the other hand a filling element of flexible, soft and resilient material, fitted in the cavity formed by said curved rib.

**3,787,916**

## FLOOR SURFACE CLEANING AND DRESSING APPARATUS

**Kaoru Akagi, Osaka, and Katushi Tanaka, Nishinomiya, both of Japan, assignors to Daihatsu Kogyo Co., Ltd., Osaka and Kyokuto Kaihatsu Kogyo Co., Ltd., Nishinomiya-shi, Hyogo-ken, both of, Japan**

**Filed Aug. 7, 1972, Ser. No. 278,382**
**Claims priority, application Japan, Aug. 13, 1971, 46-61891**
**Int. Cl. A47l** *11/282;* **A63d** *5/10*
**U.S. Cl. 15—4** **16 Claims**



An apparatus for cleaning and applying dressing to a floor surface which comprises a battery operated, manned vehicle and a floor maintenance unit telescopically movably supported by the vehicle at the front thereof to enable the floor maintenance unit to enter, when projected, a narrow space where the vehicle cannot enter. The floor maintenance unit includes a rotatable brush, a rotatable polisher, a web of disposable sheet material and a liquid dressing applicator, a mode of operation of the floor maintenance unit being selected as desired.

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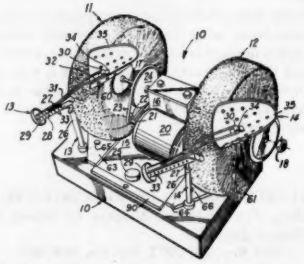
**3,787,917**

## SHOE SHINE APPARATUS

**George D. Lashley, 3098 Old Norcross Rd., Tucker, Ga.**

**Continuation-in-part of Ser. No. 224,117, Feb. 7, 1972. This application Oct. 16, 1972, Ser. No. 297,877**
**Int. Cl. A47l** *23/02, 23/18*
**U.S. Cl. 15—31** **12 Claims**



Apparatus for use in shining shoes, including a pair of power driven shoe brushing means rotatable about a common horizontal axis, with each shoe brushing means operatively associated with a shoe supporting means. Each of the shoe supporting means is mounted for power rotation about a vertically disposed axis and includes releasable retaining means for engaging the interior of a supported shoe. The shoe supporting means are detailed in location relative to the brushing means so that all polished surfaces of a pair of supported shoes are contacted during rotation of the brushing means and shoe supporting means. A single motor is operatively associated with the shoe brushing means and the shoe supporting means for automatically effecting simultaneous rotation thereof in a

shoe shining operation. The shoe shining apparatus includes polish dispensing means operatively associated with each of the brushing means, with the polish dispensing means including cover means supported between the polish dispensing means and the shoe brushing means and selectively movable between closed and opened conditions to permit polish to be applied to shoes during rotation of the brushes.

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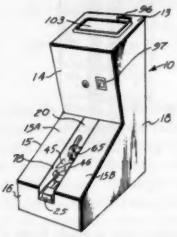
**3,787,918**

## SHOE POLISHING MACHINE

**Robert J. Ebert, 9869 Strawberry Ln., Chesterland, Ohio**

**Filed Aug. 28, 1972, Ser. No. 283,947**
**Int. Cl. A47l** *23/02*
**U.S. Cl. 15—31** **11 Claims**




A coin controlled shoe shining machine having a shiftable shoe receiving carriage within a housing, the carriage being shiftable back and forth by an operator when his shoe is resting on the carriage. The coin initiates the operation of a timer which controls the operation of solenoids for activating polish dispensers positioned on each side of the carriage. The timer also controls the operation of the motors for two brushes which engage the side of the shoe as the carriage is advanced and retracted along the trackway. Additionally, the timer controls the operation of a third brush which engages the toe portion of a shoe as the carriage is advanced and retracted. The timer is set for controlling the operation of the solenoids and the brush motors for predetermined intervals of time. The invention also includes the use of two such units mounted side-by-side within a housing for shining black shoes and brown shoes, as well as one such unit with separate dispensers for black and brown polish on each side of the shoe, together with means for selectively operating the machine to shine brown or black shoes.

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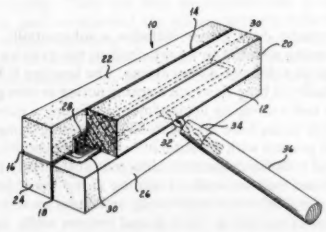
**3,787,919**

## REVERSIBLE SPONGE RUBBER MOP, BRUSH OR DUSTER

**Herbert A. Siemund, 2800 N. Lake Shore Dr. Apt. 320, Chicago, Ill.**

**Filed May 16, 1972, Ser. No. 253,880**
**Int. Cl. A47l** *13/25, 13/46*
**U.S. Cl. 15—244 CH** **2 Claims**




A reversible sponge rubber brush, mop or duster which includes a resiliently compressible rectangular block of a synthetic or sponge rubber having rectangular side portions and opposite end portions of a substantially square section with the length of the sponge rubber block being substantially greater than the width thereof, and in which rectangular block there may be provided peripherally extending slots which effectively divide the block into four rectangularly shaped sponge rubber portions which are interconnected within the block by an inner resilient web portion of the block located inwardly of the opposite end and side portions of the block and effectively defined by the slots extending peripherally of the side and end portions of the block. The peripheral slots in the resilient block are so arranged that a wire form or loop of a rigid material provides a holder for the resilient sponge rubber block. The wire loop may be selectively recieved in the slots extending peripherally in the sides and end portions of the block to present for use a work surface of one or another of the rectangularly shaped resilient sponge rubber portions of the sponge rubber block. Thus, there is provided a reversible sponge rubber brush, mop or duster including rectangular portions providing four working sides or surfaces, each of which may be selectively exposed to a surface to be cleaned.

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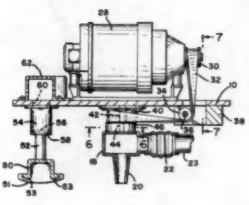
**3,787,920**

## VACUUM CLEANER SUCTION TOOL WITH ORBITAL NOZZLES FOR CLEANING DEEP PILE SHAG RUGS

**Robert A. Evans, and Horace W. Brundage, both of Stamford, Conn., assignors to Consolidated Foods Corporation, Old Greenwich, Conn.**

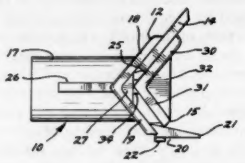
**Division of Ser. No. 152,714, June 24, 1971, abandoned. This application Jan. 8, 1973, Ser. No. 321,806**
**Int. Cl. A47l** *9/04*
**U.S. Cl. 15—416** **5 Claims**




In accordance with the present invention there is provided a suction cleaning tool having a plurality of elongated tube-like nozzles extending downwardly from a manifold supported from a base member by rubber mounts and rapidly moved, either back and forth or orbitally, by a suitable electric motor secured to the base member, or the manifold may be mounted for reciprocating pivotal movement. An elongated suction nozzle is also supported beneath the base member in a manner permitting bertical movement of the nozzle.

The base member is provided with a supporting wheel at each end and at the center with an elbow member to which may be coupled a hollow wand which serves as both a manipulating handle and suction conduit means to the opposite end of which may be connected a flexible suction hose leading to a source of suction in a vacuum cleaner. The elbow is connected to both the manifold and the elongated suction nozzle and valve means, operable by a control handle on the wand, is provided for selectively connecting the elbow to either the manifold or the nozzle, or to both.

3,787,921
WINDSHIELD SCRAPER
Robert G. Feldmann, Eden Prairie, Minn., assignor to Pyroil Company, Inc., La Crosse, Wis.
Filed June 12, 1972, Ser. No. 261,635
Int. Cl. A47l *1/06, 1/16*
U.S. Cl. 15—105 1 Claim



A scraper for an automobile windshield or the like with an elongated scraper head mounted crosswise at the end of an elongated handle. The head has a V-shape in cross section opening forwardly away from the handle. An ice scraper blade extends integrally from and along one wall of the head while a flexible scraper blade is held along the other wall of the head between said wall and a keeper member secured to the head, said keeper member having a plurality of sharp projecting teeth penetrating the flexible blade.

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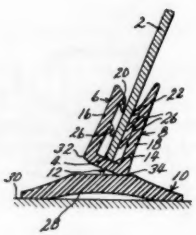
3,787,922
EDGE PROTECTOR
Charles L. Foy, Southfield, Mich., and Harmon W. Arnold, Carthage, Mo., assignors to Flex-o-Laters Inc., Carthage, Mo.
Filed July 21, 1971, Ser. No. 164,561
Int. Cl. A47g *1/10*
U.S. Cl. 16—1 5 Claims



An edge protector adapted to be applied over the edges of metal, glass or other sheet materials to prevent damage to the edges of said sheets, and to prevent damage by said edges to adjacent sheets, consisting of continuously extruded section of resilient plastic including in cross-sectional contour, a U-shaped clip portion adapted to engage frictionally therein the edge portion of a sheet, a broad shock-absorbing head portion adjacent the closed edge of the clip portion, and a thin, narrow neck interconnecting the clip and head portions whereby the head portion can tilt laterally with respect to the clip portion.

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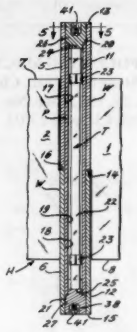
3,787,923
HINGE WITH TORSION BAR
Francis C. Peterson, Affton, Mo., assignor to C. Hager & Sons Hinge Manufacturing Company, Saint Louis, Mo.
Filed Jan. 17, 1972, Ser. No. 218,151
Int. Cl. E05f *1/12*
U.S. Cl. 16—184 3 Claims

A torsion bar is provided within a hinge having leaves which fit on the same door as leaves presently used in this country, so as to bias the door toward a closed or open position. The torsion bar is mounted within a tubular pivot pin portion of the upper knuckle and the lower portion of the lower knuckle. The plugs do not extend above the upper knuckle or below the



lower knuckle. The torsion bar is made from a plurality of thin spring steel members of predetermined length, which are connected together by bands. The ends of the torsion bar fit within slots in the inner ends of said plugs, which inner ends fit within the tubular pivot pin.

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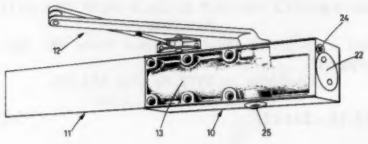
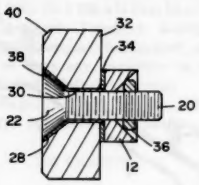
3,787,924
AUTOMATIC DOOR CLOSER WITH SUBSTANTIALLY PRISM-SHAPED HOUSING
Dietrich Jentsch, Ennepetal, Germany, assignor to Dorma-Baubeschlag GmbH & Co. KG, Ennepetal-Voerde, Germany
Filed Jan. 17, 1973, Ser. No. 324,518
Claims priority, application Germany, Jan. 18, 1972, 2202084
Int. Cl. E05f *3/00*
U.S. Cl. 16—49 9 Claims



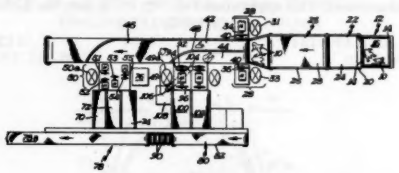
An automatic door closer includes a substantially prism-shaped housing adapted to be attached to the exterior of the upper edge of a door or a door frame. The housing is formed with a cylindrical bore in which a spring acting as energy storing means and a damping arrangement including a piston axially movable in the bore are located. The housing comprises a cylindrical portion with an outer substantially cylindrical surface coaxial with the cylindrical bore and substantially parallel plane top and bottom walls extending along the cylindrical portion integral therewith and having end edges located in two parallel planes normal to the top and bottom walls. A cover sheet is connected to those end edges which, in the attached position of the door closer, face away from the door or the door frame to which the housing is attached.

3,787,925
**PLASTIC WHEEL ASSEMBLY FOR OVERHEAD CONVEYORS**
Clarence G. Dawson, Dallas, Tex., assignor to FEI, Inc., Dallas, Tex.
Filed Dec. 7, 1972, Ser. No. 312,876
Int. Cl. A47h *15/00*
U.S. Cl. 16—107 8 Claims




The specification discloses a wheel assembly for attachment to an overhead conveyor bracket which includes a bolt having an outwardly conical head for being received at one end by the conveyor bracket. The assembly includes a ferrule comprising a cylindrical portion through which the bolt extends and an outwardly flared conical end portion for receiving the flared bolt head. A conveyor wheel having a generally cylindrical exterior and a central opening therethrough is dimensioned to receive the ferrule. The central opening through the wheel communicates with a conical portion for receiving the conical end portion of the ferrule. The conveyor wheel is constructed from a self-lubricating plastic having high abrasion resistance and a low coefficient of sliding friction. In the preferred embodiment, the wheel is comprised of an ultra-high molecular weight polymer having a coefficient of friction of about 0.11 and a specific gravity of about 0.945.

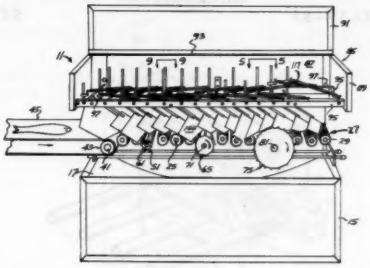
3,787,926
**APPARATUS FOR CUTTING AND PACKING POULTRY**
Henry Neil Schacht, Decatur, Ala., assignor to The Pillsbury Company, Minneapolis, Minn.
Division of Ser. No. 66,976, Aug. 26, 1970. This application May 24, 1972, Ser. No. 256,502
Int. Cl. A22b *3/08*
U.S. Cl. 17—11 R 8 Claims



Chickens which have been eviscerated and chilled are transferred to a first handling station where they are cut in half transversely. They are then segregated into front and rear halves and transported via segregated channels to a second and a third handling station. The wings are removed at the second handling station and the legs are removed at the third handling station. The parts are then packed in plastic or fiber trays.

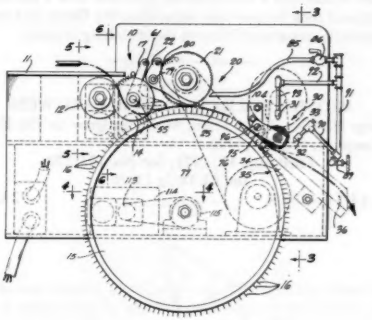
3,787,927
**FISH SCALING MACHINE**
Albert Simard, R.R. 01, Old Castle, Ontario, Canada
Filed May 26, 1972, Ser. No. 257,392
Int. Cl. A22c *25/02*
U.S. Cl. 17—64 5 Claims

In a fish scaling machine having a horizontally disposed fish conveyor with a series of spaced descaler rolls extending at right angles to the direction of feeding with the fish fed by the conveyor in a continuous manner, an improved hold down and guide mechanism operatively and yieldably engaging one side of the fish as they move thereunder which includes mounted upon a pair of spaced rails a series of spaced rock shafts jour-



nalled on said rails and supporting a series of fan-shaped longitudinally overlapped downwardly and rearwardly converging blades which are affixed to said rock shafts and with spring means for urging the undersurface portions of said blades into operative yieldable engagement with the fish as they pass thereunder.

3,787,928
**SHRIMP SPLITTING AND CLEANING APPARATUS**
Edward H. Domecki, 2140 N.E. 30th St., Lighthouse Point, Fla.
Filed June 19, 1972, Ser. No. 264,358
Int. Cl. A22c *29/00*
U.S. Cl. 17—71 19 Claims



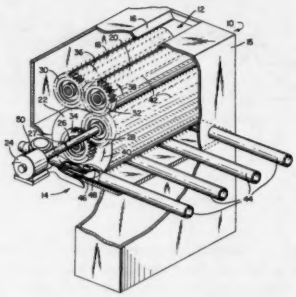
A shrimp splitting and cleaning machine in which the shrimp are mounted on a rotating transport wheel which feeds them through the splitting and cleaning mechanism. Flexible guide wheels position the shrimp on the transport wheel while a spring urged pressure fork forces the shrimp onto pins that protrude from the transport wheel. The latter then moves the shrimp through a saw which cuts through the center of the shrimp longitudinally without severing the bottom layer of its shell. The shrimp is then fed into a spreading knife which enters the cut shrimp and splits it open like a book. The wheel then moves the opened shrimp past a rotating brush while water under pressure is directed onto the shrimp to thoroughly clean out the vein and roe and loose particles of shell that may be present. A lifting fork then dislodges the shrimp from the pins on the transport wheel and a chute directs the cleaned shrimp onto a conveyor for removal from the machine.

3,787,929

## COMPRESSED AIR SCUTCHER

Joon Woo Nam, and Ung So Choi, both of Seoul, South Korea, assignors to Korea Institute of Science and Technology, Cheng Ryang, Seoul, South Korea

Filed Feb. 14, 1972, Ser. No. 226,089
Int. Cl. D01b 9/00
U.S. Cl. 19—83 5 Claims



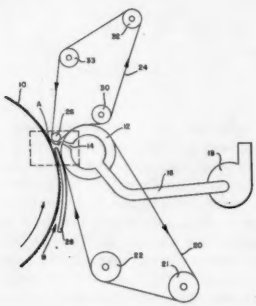
A device for and method of scutching short fibers by use of compressed air are provided. The device includes a scutching section comprising a plurality of pipes having entrance openings for receiving fibers to be separated and exit openings for discharging the fibers to a diffusion area. In operation, compressed air is applied to the pipes to produce an air flow to provide areas of low pressure adjacent to the entrance openings to produce an entrainment flow to draw the fibers through the openings into the pipes whereby the fibers are separated upon expansion of the air flow from the exit openings into the diffusion area. A preferred embodiment of the scutching device includes a supply section having a pair of feeder rollers and a feeder drum provided with a plurality of peripheral pins for partially separating the fibers and feeding the partially separated fibers to the scutching section.

3,787,930

## PROCESS FOR RANDOMIZING CARD WEBS

George H. Allen, West Acton, Mass., assignor to The Kendall Company, Walpole, Mass.

Filed Aug. 12, 1971, Ser. No. 171,270
Int. Cl. D01g 15/46
U.S. Cl. 19—106 R 2 Claims



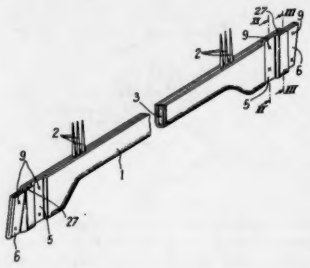
The generally parallelized orientation of fibers being removed from the doffer of a card is randomized by withdrawing the web of fibers by means of a pair of conveyor belts and a vacuum slot situated adjacent to the rotating doffer surface.

3,787,931

## COMB FOR TEXTILE MACHINE

Jean Frederic Herubel, Guebwiller, France, assignor to N. Schlumberger & Cie, Guebwiller, Haut-Rhin, France

Filed Oct. 1, 1971, Ser. No. 185,522
Claims priority, application France, Oct. 6, 1970, 70.35964
Int. Cl. D01g 5/14
U.S. Cl. 19—129 R 2 Claims



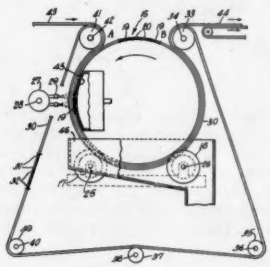
The needle bar which is constituted by a rectilinear metal body having a U-shaped cross-section in which the needles are anchored by means of a bonding agent and which is provided at each end with a lug and a guide heel having a greater height than said body and projecting only on the back side of the comb body is characterized in that the assembly formed by the needle-bar body and needle-bar lugs and heels constitutes a one-piece component of die-stamped sheet steel having a U-shaped cross-section, the lugs and heels being formed by suitable portions of one of the two walls of said component, said portions being flattened by compression against the other wall of said component.

3,787,932

## METHOD AND APPARATUS (CONTINUOUS IMPERFORATE PORTIONS ON BACKING MEANS OF CLOSED SANDWICH)

Frank Kalwaites, Gladstone, N.J., assignor to Johnson & Johnson, New Brunswick, N.J.

Continuation-in-part of Ser. No. 22,309, March 24, 1970, abandoned. This application Feb. 10, 1972, Ser. No. 225,331
Int. Cl. D04h 13/00
U.S. Cl. 19—161 P 4 Claims



Method and apparatus for producing nonwoven fabrics that contain holes or other areas of low fiber density and have a plurality of patterns of groups of fiber segments that alternate and extend throughout the fabric. The method and apparatus include the steps of positioning the starting web between an apertured forming means and a backing means that has continuous imperforate portions that lie between and intercon-

nect discontinuous foraminous portions, then directing fluid rearranging forces through the apertures of the forming means against the fibers of the starting web, causing some of the fluid streams to strike continuous imperforate portions of the backing means and all of the fluid streams ultimately to pass through the foraminous portions of the backing means.

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**3,787,933**

## APPARATUS FOR CARRYING AND LOADING TOP-ROLLERS IN A DRAWING MACHINE

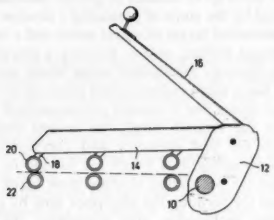
**Ernst Dausch, Stuttgart; Friedrich Kubler, Ludwigsburg; Theodor Hempel, Stuttgart-Weilimdorf, and Franz Fuchs, Magstadt, all of Germany, assignors to SKF Kugellagerfabriken GmbH, Schweinfurt, Germany**

**Filed Apr. 21, 1971, Ser. No. 135,869**

**Claims priority, application Germany, Apr. 22, 1970, 2019352**

**Int. Cl. D01h** *5/46*

**U.S. Cl. 19—267** **7 Claims**




Apparatus for carrying and loading top rollers comprising a carrier arm and an operating lever movable about a fixed shaft. The carrier arm and the lever are interconnected for movement about the shaft. A second fixed point or shaft is provided which cooperates with the first shaft to convert the pivoting movement of the carrier arm into an upward movement, creating a partial load position in addition to a closed and open position.

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**3,787,934**

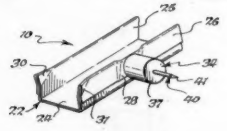
## DEVICE FOR JOINING CANVAS BOARDS

**Edward F. Gross, 456 Capen Blvd., Eggertsville, N.Y.**

**Filed July 11, 1972, Ser. No. 270,664**

**Int. Cl. A44b** *21/00*

**U.S. Cl. 24—85 R** **10 Claims**




A device for joining one canvas board having a freshly painted surface to another board in spaced, substantially parallel relation thereto and protecting the freshly painted surface. A clip member in the form of a channel member is adapted to be fitted over an edge of one of the boards and an elongated spacer member is mounted on the clip member, in particular being secured at one end to a flange of the channel member, and is disposed so as to extend in a direction away from and generally perpendicular to the plane of the one canvas board. A pin member is secured to and extends from the spacer member in a direction away from and generally perpendicular to the plane of the one board and is adapted to be driven into the other board. Several devices, for example four, are used to join two canvas boards.

**3,787,935**

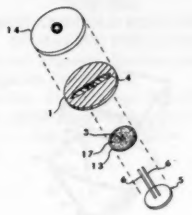
## SELF-ATTACHING BUTTON

**John R. Kapitan, 405 S. Kipling St., Lakewood, Colo.**

**Filed June 9, 1971, Ser. No. 151,316**

**Int. Cl. A44b** *1/12*

**U.S. Cl. 24—113 MP** **4 Claims**




A self-attaching button assembly having a socketed body and a pronged bore. The prong is deformed in the course of engaging it in the socket to unite the parts. The assembly can be quickly attached to articles of clothing without needle and thread or other tools by individuals with no sewing training or experience. A decorative top covers the body which functions as a foundation for the decorative top.

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**3,787,936**

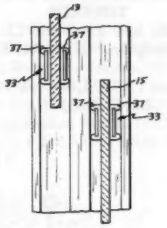
## SLIDING DOOR SILENCER

**Arnold O. Rystad, Lakeport, Calif., assignor to Work Right Products Inc., Hayward, Calif.**

**Filed Oct. 16, 1972, Ser. No. 297,923**

**Int. Cl. A44b** *21/00*

**U.S. Cl. 24—262 R** **6 Claims**




A silencer bearing element for use with a sliding glass door panel is adapted to be slid over the edge of the door in any desired position. The silencer includes a U-shaped retaining member having resilient sound damping bearing elements slid on and opposing each other on the upwardly extending opposite sides thereof to enable the silencer to be secured to the edge of the door panel with a minimum of effort.

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**3,787,937**

## METHOD OF PROCESSING A COLOR CATHODE-RAY TUBE

**Kazimir Palac, Carpentersville, Ill., assignor to Zenith Radio Corporation, Chicago, Ill.**

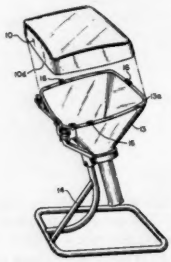
**Division of Ser. No. 138,073, April 28, 1971, Pat. No. 3,737,065. This application Feb. 7, 1973, Ser. No. 330,374**

**Int. Cl. H01j** *9/18*

**U.S. Cl. 29—25.13** **4 Claims**

In one step of the screening process, the shadow mask of a color tube is mounted from studs provided in the faceplate

section. The faceplate is then introduced into an exposure chamber where it is supported at three points spaced along the sealing land near the locations of the support studs. This establishes the faceplate in a reference mode, free of twisting moments and elastic deformation. When the screening process is completed, the faceplate is superposed over the enlarged end of the funnel section of the tube envelope and supported therefrom at three spaced points similarly disposed along the sealing land of the funnel to engage the faceplate at the same spaced points of support effective in the exposure step. This re-establishes the faceplate in its reference mode. Frit sealing material is disposed between the sealing lands of the envelope sections and the assembly is heated to seal the faceplate and funnel to one another along the entirety of the sealing lands.



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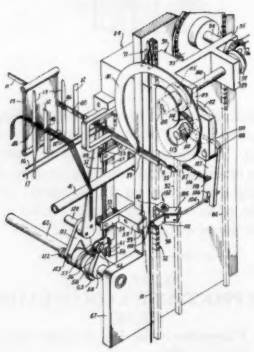
**3,787,938**

## METHOD AND APPARATUS FOR DRAWING IN WARP THREADS

**Charles B. Crandall, and Frederick L. Wieneke, both of Rockford, Ill., assignors to Barber-Colman Company, Rockford, Ill.**

**Filed June 12, 1972, Ser. No. 262,105**
**Int. Cl. D03j 1/16**
**U.S. Cl. 28—44** **6 Claims**



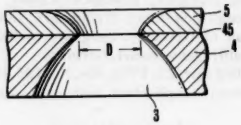
Mechanism for drawing short lengths of thread of yarn through the weaving elements of a loom in a preselected manner while leaving an end portion of each thread exposed for subsequent tying to the thread of yarn on a warp beam.

**3,787,939**

## METHOD OF MANUFACTURING SHADOW MASKS

**Yoshifumi Tomita, Mobara, and Masamoto Akeyama, Kokubunzi, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed May 6, 1971, Ser. No. 140,917**
**Claims priority, application Japan, May 6, 1970, 45/38484**
**Int. Cl. H01j 9/14**
**U.S. Cl. 29—25.11** **6 Claims**



A shadow mask to be utilized in a color cathode ray tube is manufactured by the steps of preparing a shadow mask blank including laminated layers of a first metal and a second metal having different melting points, forming a plurality of small perforations through the shadow mask blank such that each perforation has a first predetermined diameter at the junction between the layers and a second predetermined diameter in the layer of the second metal, the second diameter being smaller than the first diameter and corresponding to the diameter of phosphor dots which are formed on a phosphor surface when the perforated shadow mask blank is used as a mask pattern for forming the phosphor dots by conventional photo-etching techniques and subjecting the perforated shadow mask to heat treatment for melting the layer of the second metal to enlarge the second diameter.

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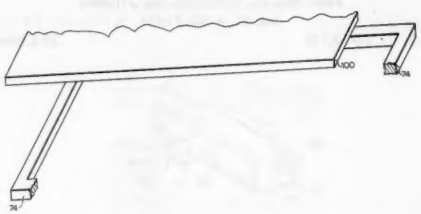
**3,787,940**

## SEGMENT DISPLAY PANEL WITH CATHODE GROUPS

**George Andrew Kupsky, Milford, N.J., assignor to Burroughs Corporation, Detroit, Mich.**

**Division of Ser. No. 97,886, Dec. 14, 1970, and a continuation-in-part of Ser. No. 61,642, Aug. 6, 1970, abandoned. This application Dec. 4, 1972, Ser. No. 312,838**
**Int. Cl. H01j 9/18**
**U.S. Cl. 29—25.16** **8 Claims**



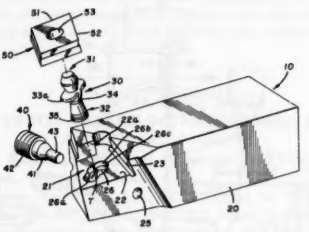
A gas-filled display panel includes a plurality of groups of cathode electrode segments, each group having an anode electrode, the cathodes in each group being selectively energizable, with the associated anode, to glow and display a character. The cathode electrode segments are made up of strips of conductive material covered by an insulating layer which has at least one aperture exposing each conductive strip and with a conductive member in each aperture in direct contact with the associated conductive strip. Each conductive member comprises a cathode which can glow, with the glow filling the aperture in which the conductive member is seated. The cathodes are selectively energized so that the combined glow represents a character.

3,787,941

## LOCKING PIN MECHANISM FOR SECURING TOOL BITS TO TOOL HOLDERS

Raymond E. Novkov, Cuyahoga Falls, Ohio, assignor to The Warner & Swasey Company, Cleveland, Ohio

Filed July 17, 1972, Ser. No. 272,428
Int. Cl. B26d 1/00
U.S. Cl. 29—96 7 Claims



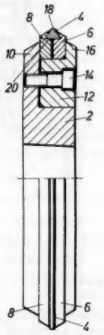
An improved locking arrangement for securing cutting tool bits to tool holders is provided by the use of a locking pin that is shiftably carried by the tool holder and has a projecting head portion that is received within the tool bit so that camming action on the pin shifts the tool bit between clamped and unclamped positions with respect to the tool holder. One unique feature of the improved locking mechanism is the use of an elongated flange on the pin that is received within a complementary shaped slot provided in the tool body, with this arrangement permitting a controlled tilting of the pin by the camming means to more efficiently draw the clamping bit into seated engagement with the tool holder. A second feature is the contouring of the tilting pin in such a manner that the same remains secured with regard to the tool holder even though it is in its loosened condition with the result that dropping or accidental displacement of the tilting pin is avoided during periods of tool bit changing or indexing.

3,787,942

## ROLLS

Ali Bindernagel, Dusseldorf-Gerresheim, and Friedrich Karl Mattheis, Heiligenhaus, both of Germany, assignors to Firma Friedrich Kocks, Dusseldorf, Germany

Filed Feb. 9, 1972, Ser. No. 224,877
Claims priority, application Germany, Nov. 2, 1971, 2106549
Int. Cl. B21b 31/08
U.S. Cl. 29—125 10 Claims



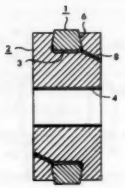
A roll is provided for metal rolling having a main rotary body, a hard tire providing a rolling surface and having a cross section which increases in width from the rolling surface toward the roll axis and two collars attached to the periphery of the main body and firmly enclosing a portion of the tire to secure said tire to the body while leaving the rolling surface exposed.

3,787,943

## ROLLER FOR HOT AND COLD ROLLING AND METHOD OF MAKING THE SAME

Kaj Ragnar Loqvist, Fagersta, Sweden, assignor to Fagersta Aktiebolag, Fagersta, Sweden

Filed Dec. 21, 1971, Ser. No. 210,440
Claims priority, application Sweden, Jan. 8, 1971, 170/71
Int. Cl. B21b 31/08
U.S. Cl. 29—125 4 Claims



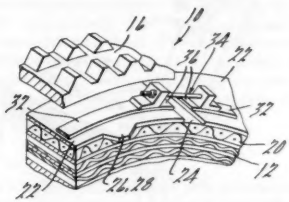
A roller for hot and cold rolling is made by taking a hard metal ring, the cross-section of which decreases radially outwardly, and casting around the inside and at least the inner part of the radial sides thereof an annular hub of ferro alloy. After casting, the hub and the hard metal ring are cooled, the hub shrinking more than the hard metal ring so as to exert compressive forces thereagainst to hold the same in place.

3,787,944

## METHOD OF ASSEMBLING A GAS TURBINE REGENERATOR ASSEMBLY

Jerome J. Mittman, Dearborn Heights, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Division of Ser. No. 181,925, Sept. 20, 1971, Pat. No. 3,741,287. This application Nov. 8, 1972, Ser. No. 304,865
Int. Cl. B21d 53/02; B23p 15/26
U.S. Cl. 29—157.3 R 3 Claims



Assembly method for a gas turbine regenerator assembly are described. The regenerator assembly comprises a cylindrical regenerator core, an annular drive member surrounding the cylindrical surface of the regenerator core and separated from it to define an annular space, and a resilient material positioned in the annular space between the drive member and regenerator core. A mounting ring is also located in the annular space. The mounting ring has a discontinuity in it which permits its diameter to be varied to compress the resilient material during assembly. The assembly method includes the steps of surrounding the cylindrical surface of the regenerator core with the resilient material, placing the annu-

lar mounting ring around the resilient material and regenerator core, applying forces to the mounting ring to reduce its diameter, positioning the drive member around the mounting ring, and reducing the previously applied forces to permit the mounting ring diameter to increase.

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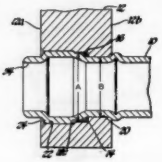
**3,787,945**
**METHOD OF FABRICATING AN EXPANDED TUBE CONNECTION**

**James E. Pasek; James M. Shea, and Michael F. Tobin, all of Saginaw, Mich., assignors to General Motors Corporation, Detroit, Mich.**

**Division of Ser. No. 254,560, May 18, 1972, abandoned. This application May 14, 1973, Ser. No. 360,031**
**Int. Cl. B21d** *53/02*; **B23p** *15/26*
**U.S. Cl. 29—157.4** **5 Claims**



An expanded tube connection and method wherein a relative thin-walled tube extending through a counterbored tube block is upset on one side of the tube block to lock the tube to the tube block and wherein the tube is expanded within the apertured tube block to lock it to the tube block while at the same time providing a predetermined size cavity between the tube and the tube block for an O-ring seal.

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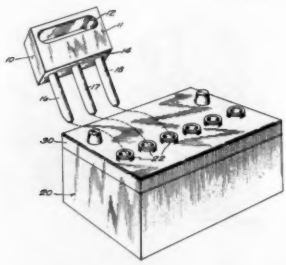
**3,787,946**
**PLUG REMOVER**

**Robert Schimek, Milwaukee, Wis., assignor to Globe-Union Inc., Milwaukee, Wis.**

**Filed June 28, 1972, Ser. No. 267,129**
**Int. Cl. B23p** *19/00*; **H01m** *35/18*; **B23p** *19/04*
**U.S. Cl. 29—200 D** **7 Claims**

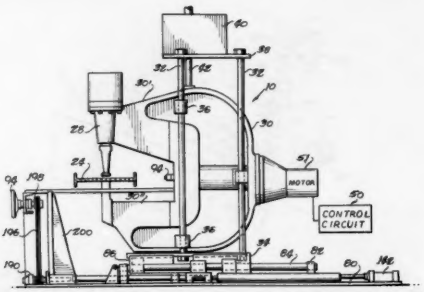


A device for removing resilient, cuplike sealing caps from sealing engagement with openings. A plurality of projections extend from a gripping member and are constructed to engage a multiplicity of the caps at one time, the ends of the projections engaging an inner wall surface of the cap near its bottom and being pivoted by means of an upper opposing wall surface to exert an upward force on the cap to remove it from sealing engagement. The plug remover is particularly adaptable for use in removing sealing plugs from the covers of lead acid storage batteries.

**3,787,947**
**AUTO SPACE MECHANISM FOR FABRICATING APPARATUS**

**Raymond L. Valente, Kankakee, and Otto A. Bonomo, Matteson, both of Ill., assignors to Manco Mfg. Co., Bradley, Ill.**

**Filed Sept. 12, 1972, Ser. No. 288,256**
**Int. Cl. B23p** *19/04*
**U.S. Cl. 29—208 C** **4 Claims**




A machine is disclosed herein for effecting fabrication of structural members, or the like, the machine comprising a work station having tooling means, drive means for advancing the structural member longitudinally of said work station, and apparatus for properly positioning the tooling means with respect to a predetermined location at which tooling operations are to be performed on the structural member. The positioning apparatus includes an indexing arrangement, as well as gauge means which permits automatic operation of the machine, such that tooling means may be initially positioned with respect to a transverse axis of the structural member and then moved along this axis in short, controlled increments to and from the points at which the tooling operations are to be performed. The tooling means are positioned in response to the energization of a stepping motor controlling the short, controlled increments of movement.

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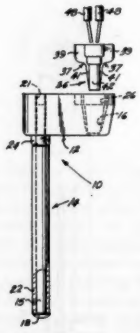
**3,787,948**
**WIRE NUT WRENCH**

**Charles H. Runge, 25755 Melba Ave., Homeland, Calif.**

**Filed Apr. 7, 1972, Ser. No. 241,909**
**Int. Cl. H05k** *13/00*
**U.S. Cl. 29—203 H** **10 Claims**



A wrench for forming pigtail splices in wire nuts between electrical conductors. The wrench has a plastic workhead in

the form of a relatively narrow block. There is a wire nut socket running from top to bottom through the workhead, near one end. A thin metal handle extends downwardly from the workhead near the end opposite its wire nut socket end. To form a pigtail splice in a wire nut with the wrench, the wire nut is fitted into the socket in the workhead, and the bare ends of a pair of conductors are then inserted as far as they will go into the wire nut. These conductors are next held tightly with one hand near the wire nut, and the workhead is spun rapidly around the axis of the wire nut socket, by means of the wrench handle, with the other hand. This action twists the wire ends into a pigtail splice and tightens the wire nut firmly in place around the splice.

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**3,787,949**

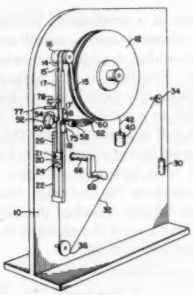
## APPARATUS FOR ASSEMBLING AND WINDING A STRIP ABOUT LEAD WIRES

**Charles C. Rayburn, Glenview, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.**

**Division of Ser. Nos. 4,386, Jan. 20, 1970, Pat. No. 3,576,481, and Ser. No. 104,887, Jan. 8, 1971, Pat. No. 3,715,784. This application Aug. 30, 1972, Ser. No. 284,855**

**Int. Cl. H05k** *13/00*

**U.S. Cl. 29—203 D** **4 Claims**



An apparatus for forming a miniature capacitor from a single strip of dielectric material metalized on each of its sides is disclosed. The strip passes from a supply reel over a guide roller and along a feed chute to a winding station, where it is initially located between the first lead wire and a retractable winding pin located adjacent an elongated slot. The strip then proceeds to a take-up block in a guide chute. The winding pin orbits so as to carry the strip around the first lead wire in the form of a loop which is wound into the capacitor after the second lead wire has been inserted. The first lead wire is loaded in an axial direction at one end of the slot and carried to the other end of the slot by the looped strip as the strip is carried around the lead wire by the orbiting of the winding pin and slot. The second lead wire is then fed into the slot along the same axis as the first lead wire was fed, and the winding pin is retracted, without any interruption in the winding. The leads are then retained in the capacitor by heat shrinking the dielectric strip.

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**3,787,950**

## APPARATUS FOR RECLAIMING COLLET HOSE FITTINGS

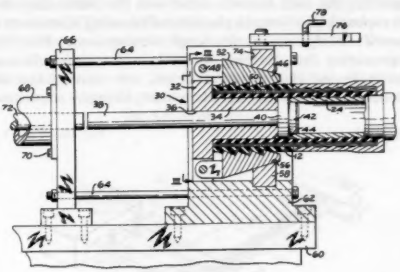
**Thomas L. Bagby, East Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.**

**Filed Mar. 1, 1972, Ser. No. 230,827**

**Int. Cl. B23p** *19/04*

**U.S. Cl. 29—237** **11 Claims**

Certain collet type hose fittings have malleable fingers radially collapsed toward its stem to secure the skived end of hydraulic hose telescoped on its stem and subsequent to the removal of the finger constricting member of the fitting a short piece of hose adjacent to the fitting can be secured on a mandrel having a co-axial plunger and the plunger advanced to abut against the distal end of the stem to force the hose fitting off the skived end of the short piece of hose, without undue deflection of the malleable fingers.



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**3,787,951**

## TOOLS FOR JOINING OR DISCONNECTING PIPES

**Charles W. Morphis, and Bennie D. Hilburn, both of Tyler, Tex., assignors to The Mead Corporation, Chillicothe, Ohio**

**Filed Apr. 14, 1972, Ser. No. 243,990**

**Int. Cl. B23p** *19/04*

**U.S. Cl. 29—237** **1 Claim**

A tool for joining or disconnecting lengths of pipe such as bell and spigot pipe in which the joints incorporate rubber-like gaskets. The tool has a handle with a yoke at its lower end disposed to fit about the pipe. A flexible member such as a length of chain is fixed at its ends to the legs of the yoke. The chain is adapted to engage the enlarged section of the pipe, that is, the bell or other enlargement, either at the rear or front thereof depending upon whether the pipe is to be joined or disconnected, respectively. The handle is connected to the plain end pipe either by a chain or a rigid bar-like member depending upon whether the pipe is to be joined or disconnected, respectively. The chain spanning the yoke acts as a fulcrum for the handle and permits one tool to be used for several sizes of pipe.

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**3,787,952**

## GAPPED AND CLEANED SEAM-TYPE SLIDE FASTENER CHAINS AND METHOD AND APPARATUS FOR MAKING THE SAME

**George B. Moertel, Conneautville, and James R. Johnsten, Meadville, both of Pa., assignors to Textron Inc., Providence, R.I.**

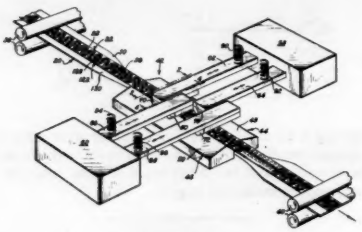
**Division of Ser. No. 33,419, April 30, 1970, abandoned. This application June 26, 1972, Ser. No. 266,095**

**Int. Cl. B23p** *11/00, 19/04*

**U.S. Cl. 29—408** **21 Claims**

Gapped and cleaned slide fastener chains including a pair of carrier tapes having their inner edges folded upon themselves to provide a seam-like appearance and having a plurality of filamentary stringers attached to the folded portions of the carrier tape at intervals separated by gapped and cleaned

areas with stitching threads securing the stringers to the folded portions and running continuously through the gapped and cleaned areas. A method of making gapped and cleaned seam-type slide fastener chain of the above described type including supporting the slide fastener chain with the filamentary stringers exposed, positioned a plurality of vibrating heads over the exposed stringers in frictional engagement therewith, reciprocating the vibrating heads in a transverse direction relative to the slide fastener chain, and moving the slide fastener chain such that the filamentary stringers sequentially



pass under each of the vibrating heads. Apparatus for making gapped and cleaned seam-type slide fastener chain of the above described type includes a guide for supporting the slide fastener chain, a plurality of vibrating heads disposed over the chain in frictional engagement with the filamentary stringers, drive rollers cooperating with the guide for moving the slide fastener chain such that stringers sequentially pass under each of the vibrating heads, and a vibrator for reciprocating the vibrating heads relative to the slide fastener chain to remove severed portions of the filamentary stringers.

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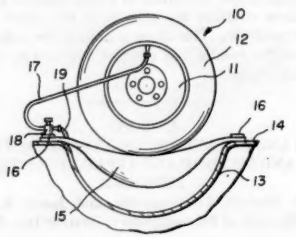
**3,787,953**

## SPARE TIRE REMOVAL SYSTEM

**Edward H. Smoot, Holcomb, N.Y., assignor to The Schlegel Manufacturing Company, Rochester, N.Y.**

**Filed Mar. 17, 1972, Ser. No. 235,596**
**Int. Cl. B23p** *19/02*
**U.S. Cl. 29—427** **3 Claims**



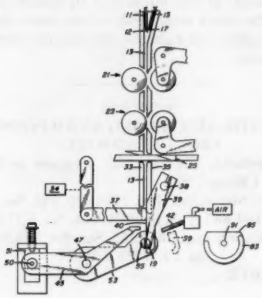

A spare tire and wheel is raised from the spare wheel well of a station wagon by using excess air from the spare tire for inflating an inflatable body in the wheel well under the spare tire. An air line connecting the spare tire and the inflatable body has a normally-closed valve that is operated to accomplish the inflation and raise the spare tire and wheel from the well.

**3,787,954**

## SCROLL WINDING AND LOADING METHOD

**John N. Gade, and James D. MacKay, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Mar. 15, 1971, Ser. No. 234,750**
**Int. Cl. B23p** *19/00*
**U.S. Cl. 29—340** **9 Claims**



A method for use in a continuous process for winding a photographic web element into a scroll and inserting such scroll into an open-ended double-chambered film cartridge body is disclosed. Winding is facilitated by a winding mechanism that accurately positions the leading end of the element with respect to a winding mandrel from which mandrel a completed scroll is advanced into the cartridge supply chamber a distance sufficient to center the free end of the element with respect to a heat sealing head. A core support member then so positions the cartridge takeup core axially within the cartridge takeup chamber that the core is aligned precisely with the free end of the element for staking thereto by means of the heat sealing head.

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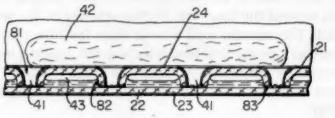
**3,787,955**

## METHOD OF MAKING ARTICLE-SUPPORTING WALL FOR COOKING PAN

**Calvin L. Wilson, Richmond, Va., assignor to Reynolds Metal Company, Richmond, Va.**

**Division of Ser. No. 220,275, Jan. 24, 1972, which is a continuation-in-part of Ser. No. 844,442, July 24, 1969, Pat. No. 3,640,209. This application July 18, 1972, Ser. No. 272,771**
**Int. Cl. B23p** *11/00*
**U.S. Cl. 29—432.2** **11 Claims**



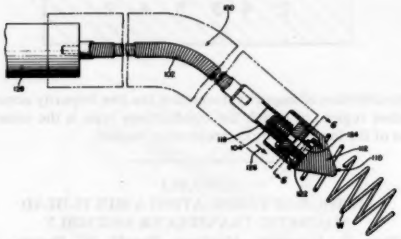

A disposable cooking pan which is particularly adapted for broiling food products is provided and such pan has metallic foil defining practically its entire exposed inside and outside surfaces. The pan has an article-supporting wall arranged above a bottom wall with a space provided therebetween for collecting juice, or the like, exuding from a product contained in the pan and the article-supporting wall has means for absorbing such juice. An improved apparatus for and method of making the article-supporting wall are also presented herein.

3,787,956

## HOSE MANUFACTURE

Glenn A. Miller, Lincoln, Nebr., assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Dec. 22, 1971, Ser. No. 210,828
Int. Cl. B23p *19/04*
U.S. Cl. 29—451 4 Claims



Method and apparatus for making hose, particularly for automotive use, in which a helical coil of stiff resilient wire is inserted and expanded into secure but non-adhered contact with the inside surface. The coil before or during insertion into the hose is reduced in diameter by effecting opposite rotations of spaced portions or turns of the coil.

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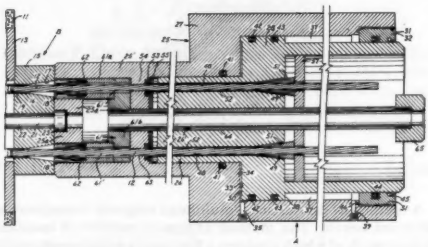
3,787,957

## METHOD AND APPARATUS FOR TENSIONING AND ANCHORING TENSIONING MEMBERS

James S. Andrews, Westminster, Colo., assignor to American Stress Wire Corporation, Englewood, Colo.

Filed July 6, 1971, Ser. No. 159,959
Int. Cl. B21d *39/00*
U.S. Cl. 29—452 15 Claims



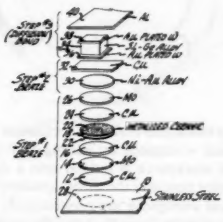
An improved method and apparatus for tensioning and anchoring tensioning members in a concrete structure and the like wherein there is provided a wedge support member having wedge-receiving pockets coaxially aligned with the anchor seats in an anchor block permitting the anchor wedges to first be inserted into the pockets and the support member then threaded over the tensioning members for supporting the anchor wedges in a released position during tensioning. The wedge support member preferably is made as an integral part of the tensioning assembly and coaxially aligned therewith so that the entire integral assembly may be threaded over the tensioning members. The tensioning assembly applies the desired tension to the tensioning members and thereafter an advancing member moves the support member to forcibly insert the anchor wedges into the respective anchor seats whereby when the tensioning assembly is released from the tensioning members the anchor wedges clampingly engage the tensioning members to anchor them under tension. Automatic release apparatus in the tensioning assembly facilitates the release of the tensioning members from the tensioning assembly by a further release or relaxation of the tensioning assembly.

3,787,958

## THERMO-ELECTRIC MODULAR STRUCTURE AND METHOD OF MAKING SAME

Norman S. Freedman, Berkeley Heights; Carel W. Horsting, Caldwell; Walter F. Lawrence, Verona, and John J. Carrona, Scotch Plains, all of N.J., assignors to Granted to the United States Atomic Energy Commission under the Provisions of 42 U.S.C. 2182, Washington, D.C.

Division of Ser. No. 162,281, Dec. 26, 1961. This application Aug. 18, 1965, Ser. No. 505,079
Int. Cl. B23k *31/02*
U.S. Cl. 29—472.3 4 Claims



1. A method of making a thermoelectric module with the aid of an insulating wafer having opposite metallized surfaces, a pair of similar equalizing sheets of metal, a hot-junction strap of metal, a thermoelectric element having hot- and cold-junction surfaces, and a radiator sheet of metal, said method comprising the steps of

a. brazing said equalizer sheets to said opposite metallized surfaces, respectively, of said insulating wafer with pure copper in a non-oxidizing ambient,

b. brazing one surface of said hot-junction strap to one of the surfaces of said equalizing sheet with a nickel-gold alloy in a non-oxidizing ambient, and

c. diffusion bonding said hot-junction surface of said thermoelectric element to the other surface of said hot-junction strap and said radiator sheet to said cold-junction surface of said thermoelectric element, said diffusion bonding being carried out in a non-oxidizing ambient, under compressive loading, at a temperature of about 550°C., and for about one-half hour.

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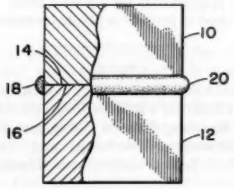
3,787,959

## DIFFUSION WELDING IN AIR

Thomas J. Moore, Berea, and Kenneth H. Holko, Strongsville, both of Ohio, assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Apr. 24, 1972, Ser. No. 247,090
Int. Cl. B23k *31/02*
U.S. Cl. 29—482 8 Claims

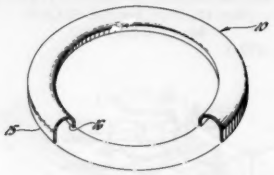



Solid state welding a butt joint by fusion welding the peripheral surfaces to form a seal, autogenetically cleaning the faying or mating surfaces of the joint by heating the abutting surfaces to 1,200°C., and heating to the diffusion welding temperature in air.

## 3,787,960
## PROCESS FOR MANUFACTURING CURVED CHANNELED MEMBERS

**Jack T. Greenleaf, Tipton, Mich., assignor to General Motors Corporation, Detroit, Mich.**

**Filed Oct. 28, 1971, Ser. No. 193,496**
**Int. Cl. B23k** *31/02*
**U.S. Cl. 29—477** **5 Claims**

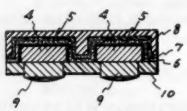


Metallic strip stock preferably of rectilinear shape is formed into a cylindrical workpiece by joining its free end portions. The cylindrical workpiece is loaded into a die having a curl ring and a forming post and the die is actuated so that the sides of the cylindrical workpiece are progressively curled over the forming post preferably from the top edge as the die strokes to a stop point whereby the sides of the workpiece are curled into an annular and generally U-shaped configuration with the top and bottom edges of the workpiece coplanar or disposed in adjacent planes that intersect the axis of the cylindrical workpiece.

## 3,787,961
## CHIP-SHAPED, NON-POLARIZED SOLID STATE ELECTROLYTIC CAPACITOR AND METHOD OF MAKING SAME

**Hiroshi Tomiwa, Osaka, Japan, assignor to Matsuo Electric Company, Limited, Osaka-fu, Japan**

**Filed June 19, 1972, Ser. No. 264,070**
**Int. Cl. B01j** *17/00*
**U.S. Cl. 29—570** **5 Claims**



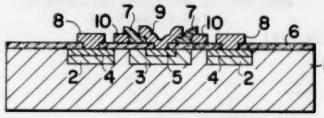
A chip-shaped, non-polarized capacitor for use on printed circuit boards. It is formed from a metal laminate consisting of a layer of solderable material and a layer of film-forming material. The film-forming material is etched to provide islands and layers of metal oxide insulating material and a metal oxide semiconductor are applied thereto. A continuous cathode layer is formed over both semiconductor layers and a resin coating is applied over the cathode layer. The solderable layer is then etched to provide separate terminals.

## 3,787,962
## INSULATED GATE FIELD EFFECT TRANSISTORS AND METHOD OF PRODUCING THE SAME

**Isao Yoshida, Kodaira; Takashi Tokuyama, Higashikurume; Shigeru Nishimatsu, Kokubunji, and Takahide Ikeda, Kodaira, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed May 13, 1971, Ser. No. 142,933**
**Claims priority, application Japan, May 13, 1970, 45/40114**
**Int. Cl. B01j** *17/00*
**U.S. Cl. 29—571** **10 Claims**

An insulated gate field effect transistor formed on one main surface of a semiconductor substrate comprising: a drain region of which the concentration of impurity is lower than twice that of the semiconductor substrate and the conductivity type is reverse to that of the substrate; and a region with a high

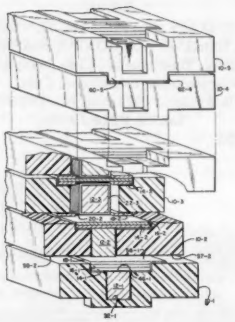


concentration of impurity, formed in the low impurity concentration region, of which the conductivity type is the same as that of the low impurity concentration region.

## 3,787,963
## METHOD OF FABRICATING A MULTI-HEAD MAGNETIC TRANSDUCER ASSEMBLY

**William E. Guntrum, Mustang; Harold W. Pexton, and Michael R. Shores, both of Oklahoma City, all of Okla., assignors to Honeywell Information Systems, Inc., Waltham, Mass.**

**Filed Feb. 5, 1973, Ser. No. 329,481**
**Int. Cl. G11b** *5/42*
**U.S. Cl. 29—603** **12 Claims**



A method of fabricating a multihead magnetic transducer is disclosed herein. The method utilizes a number of modular fixtures each of which contains a first cavity which positionally orients a head core element and a second cavity which positionally orients a spacer-shield element. The spacer-shield and head core elements are so positioned within each modular fixture so as to be in contact with each other. The modular fixtures are mated together so as to position each core and spacer-shield element with respect to the core and spacer-shield element in the adjacent modular fixture. The core and spacer-shield elements within the mated modular fixtures form a stack of elements which are in immediate contact with each other.

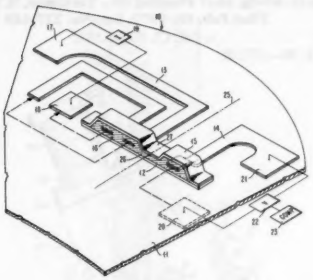
## 3,787,964
## METHOD FOR MANUFACTURING A MAGNETIC HEAD

**Paul Simon, Palo Alto, and Robert E. Jones, Jr., San Jose, both of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Dec. 23, 1971, Ser. No. 211,554**
**Int. Cl. G11b** *5/42*
**U.S. Cl. 29—603** **10 Claims**

This disclosure relates to a method for manufacturing a magnetic head. The steps of the method comprise forming a

transformer having a first magnetic layer, a primary winding, a secondary winding separated from the primary winding, the primary and secondary windings being disposed on the first magnetic layer, and a second magnetic layer disposed over the primary and secondary windings. The first and second magnetic layers encircle portions of the primary and secondary



windings thus forming a continuous magnetic path. Tests determinative of its magnetic properties are made on the transformer. Thereafter, the transformer is severed between the primary and the secondary windings and the secondary is discarded. The primary is then lapped to form a thin-film magnetic head.

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**3,787,965**

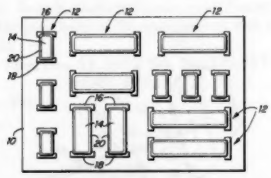
## METHOD OF MAKING RESISTOR

**Theodore F. Cocca, Everett, and Paul J. Sanders, Boston, both of Mass., assignors to Spacetac Incorporated, Bedford, Mass.**

**Filed July 21, 1971, Ser. No. 164,752The portion of the term of this patent subsequent to June 13, 1989, has been disclaimed.**

**Int. Cl. H01c** *7/00*

**U.S. Cl. 29—620** **1 Claim**



A method of manufacturing a precision resistor element of a predetermined resistance value, the resistor element including a quantity of resistive material extending between two terminals comprising removing a first portion of the resistive material in a first area between the terminals for substantially increasing the resistance to obtain a first resistance value for the resistor element, and removing a second portion of the resistive material in a second area alongside of the first area and between the first area and one of the terminals for slightly increasing the resistance to obtain the predetermined resistance value.

**3,787,966**

## METHOD OF CONNECTING A CONTACTING WIRE TO A METAL CONTACT ON THE SURFACE OF A SEMICONDUCTOR ELEMENT

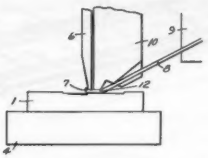
**Walter Klossika, Heilbronn, Germany, assignor to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt am Main, Germany**

**Filed Jan. 21, 1972, Ser. No. 219,664**

**Claims priority, application Germany, Jan. 29, 1971, P 21 04 207.9**

**Int. Cl. H05k** *3/00*

**U.S. Cl. 29—628** **5 Claims**



A method of connecting a contacting wire to a metal contact on the surface of a semi conductor element comprises heating the semiconductor element, retaining one end of a wire with an oxidized surface on a contact point of the metal contact, stretching the wire and simultaneously pressing the wire against the contact point and kinking the wire of this point.

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**3,787,967**

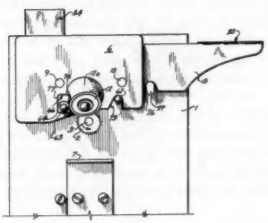
## CAN OPENER WITH POWER PIERCE, AUTOMATIC SHUT-OFF, AND REMOVABLE CUTTER MOUNTING PLATE

**Robert E. McLean, Raytown, Mo., assignor to Rival Manufacturing Company, Kansas City, Mo.**

**Filed Apr. 17, 1972, Ser. No. 244,715**

**Int. Cl. B67b** *7/38*

**U.S. Cl. 30—4 R** **8 Claims**



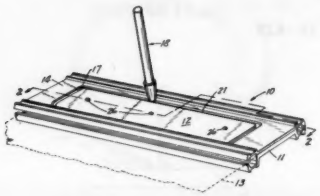
An electrically powered can opener has the features of power-pierce and automatic shut-off. A removable cutter mounting plate is separably mounted with respect to the can piercing hand lever to effectively utilize the above features. The cutter mounting plate is operatively connected to the frame with a spring biased latch member engaging cutter mounting plate and is removably located within an aperture in the hand lever. This second pin member-hand lever connection, in conjunction with the mounting means for the hand lever on can opener frame, enables the hand lever to effect the pivoting of the cutter element on the cutter mounting plate toward and away from the can feed wheel, and the appropriate orientation of a movable can guide with respect to the can feed wheel.

3,787,968

## SEGMENT CUTTER

David Littmann, Needham Township, Norfolk County, Mass., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Sept. 15, 1972, Ser. No. 289,439
Int. Cl. B26d 7/02
U.S. Cl. 30—124 3 Claims



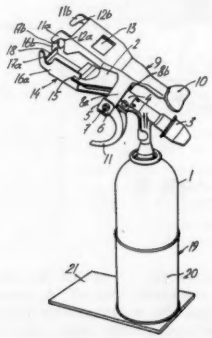
A segment cutter is formed suitable for cutting segments from a paper tape, such as encephalogram or electrocardiogram charts, which is of a compact and low-profile design. The segment cutter comprises a base member having disposed thereon one or more raised planar surfaces, a platen having an opening or openings corresponding to said planar surface and adapted to receive a length of material from which a portion is to be cut. The platen overlays the raised planar surface retaining the desired portion of the material to be cut and forming a track. A tool having a hard rotating spherical ball adapted to ride in the track is moved around the track the ball exerting pressure against the upper edge of the raised planar surface to effect cutting of the desired portion.

3,787,969

## TOOL FOR REMOVING INSULATION FROM ELECTRICAL WIRES

Algot P. Hammar, P.O. Box 303, Bjursas, Sweden

Filed Feb. 14, 1972, Ser. No. 226,049
Int. Cl. H02g 1/12
U.S. Cl. 30—140 3 Claims



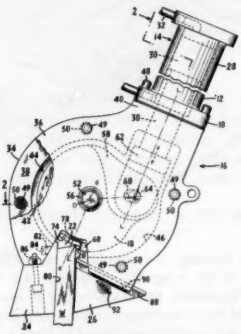
A tool for removing insulation from an electric wire comprises a gas burner having secured thereto a stationary sheet metal member and is pivotally connected to another sheet metal member which latter has a manually operable handle. The members are provided near their ends with semicircular recesses which when said members are pivoted together constitute circular cutting edges. A cutting edge extending between said circular cutting edges and in a plane perpendicular thereto is also employed. The cutting edges are located at such a distance from the burner that the flame thereof will not damage the wire to be deinsulated nor heat said edge portions to a degree which makes the de-insulation possible when said burner is set to run with a reduced fuel saving flame.

3,787,970

## BEVELLING TOOL

Adrian H. Krieg, 2627 Dunning Dr., Yorktown, N.Y.

Filed Feb. 18, 1972, Ser. No. 227,449
Int. Cl. B26d 3/02
U.S. Cl. 30—272 R 15 Claims



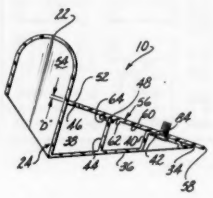
A tool for bevelling an edge of an elongated metal workpiece is provided comprising a head, a stirrup, depending from the head and a cutting member pivotally mounted within the stirrup. The stirrup defines an opening for receiving the workpiece. A hydraulic linear moving motor is mounted in the head and connected to the cutting element to swing it in an arcuate path through a corner of the opening to cut a curved groove or bevel in the workpiece.

3,787,971

## CARPET TRIM CUTTER

Lawrence R. Sutton, Detroit; Carl P. Ranno, Grosse Point, and Kenneth E. Hewson, Farmington, all of Mich., assignors to Performance Industries, Inc., Pontiac, Mich.

Filed Oct. 6, 1972, Ser. No. 298,804
Int. Cl. B26b 3/08
U.S. Cl. 30—293 7 Claims

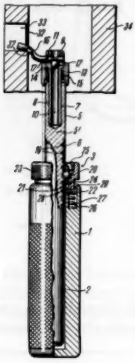


A carpet trim cutter having a blade holder which is adjustably mountable to the body of the carpet trim cutter such that a cutting blade carried by the blade holder may be selectively positioned to control the depth of cut by the cutting blade. Means are provided for selectively positioning the blade holder on the body of the carpet trim cutter including means for releasably attaching both the blade cutter and the blade to the carpet trim cutter. The carpet trim cutter is of an integral construction fabricated from a plastic material.

## 3,787,972
## DEBURRING TOOL

**Andre Carossino, Louveciennes, France, assignor to NEUMD Armaturenfabrik Apparatebau-Metallgiesserei GmbH, Knittlingen/Wurtt, Germany**

**Filed June 28, 1971, Ser. No. 157,092**
**Claims priority, application Israel, June 30, 1970, 34821**
**Int. Cl. B23d** *79/08*
**U.S. Cl. 30—317** **9 Claims**

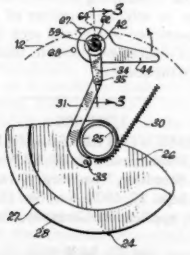


The invention relates to a manual deburring tool having a handle, a scraper blade and a blade-holder attached to the handle, and having a longitudinal bore into which a circular shank of the blade is rotatably inserted. To enable the tool to be used for working on internal edges as well as external edges, the blade-holder has a transverse bore which intersects the longitudinal bore and into which the shank of the blade is alternatively rotatably insertable. A releasable locking device is provided in the region of the intersection of the bores for holding the blade in the selected bore. The releasable locking device is in the form of a spring biased sleeve which normally holds a spherical detent member in engagement with a peripheral groove on the blade shank whether the blade shank is inserted in the longitudinal bore or the transverse bore. The blade-holder is itself releasably located in an adjusted position in the handle.

## 3,787,973
## SAFETY RETRACTING MECHANISM FOR THE LOWER GUARD OF A PORTABLE SAW

**Hanspeter E. Beisch, Buffalo Grove, and Frank A. Kaman, Prospect Heights, both of Ill., assignors to Skil Corporation, Chicago, Ill.**

**Filed Dec. 15, 1972, Ser. No. 315,307**
**Int. Cl. B27g** *19/04*
**U.S. Cl. 30—391** **7 Claims**

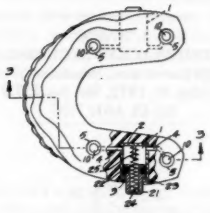


A manually operable actuator is connected to the lower guard retracting linkage by a releasable mechanism. Movement of the actuator causes swinging movement of the lower guard to its open position. Continued swinging movement of the lower guard to its open position as a result of being engaged by the work operates the releasable mechanism to disconnect the actuator from the lower guard, whereby spring means will automatically swing the lower guard to its closed position upon removal of the saw from the work irrespective of the position of the actuator. Return movement of the actuator to its closed position resets the releasable mechanism.

## 3,787,974
## DENTURE HOLDING MEANS

**John A. Gaylord, 12578 Nacido Ln., San Diego, Calif.**

**Filed Jan. 12, 1973, Ser. No. 323,282**
**Int. Cl. A61c** *13/24*
**U.S. Cl. 32—3** **9 Claims**



A unit molded into the denture which includes a casing forming a pumping chamber in the denture and being open toward the exposed side of the denture with conduits connecting two receptacles in a suction chamber or chambers which latter are open toward the gum side of the denture; a resilient pumping element in the pumping chamber is adapted to produce a suction in each receptacle; at each receptacle is an enlarged suction cavity and a suction head secured in the receptacle projects into the suction cavity and has holes in its sides communicating through the receptacle with the conduits, whereby when by suction the system is filled with a fluid, and then placed over the gum, some of the moisture is expelled by the pumping means which when released produces a predetermined suction to suck the gum into the cavity and around the suction head; The suction head is replaceable by a cavity forming element which has a suitable wire adapted to be extended through the form of the gum on which the denture is molded, thereby to assist in holding the unit in position during the molding, and also in forming the said cavity.

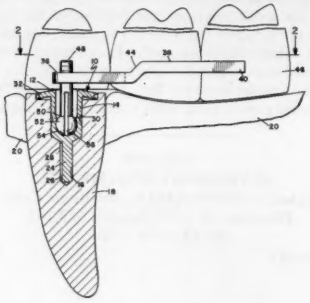
## 3,787,975
## ANCHOR FOR ATTACHING DENTAL PARTIAL OR FULL ARTIFICIAL DENTURE

**Max Zuest, 595 San Fernando, San Diego, Calif.**

**Continuation-in-part of Ser. No. 104,939, Jan. 8, 1971, abandoned. This application Sept. 18, 1972, Ser. No. 290,249**
**Int. Cl. A61c** *13/22*
**U.S. Cl. 32—5** **25 Claims**

Method and apparatus for anchoring a dental partial or full artificial denture to the root of a natural tooth that nas been cut off at the tissue line during endodontic treatment. The anchor includes a sleeve which extends into the root, the sleeve including a retaining shoulder which cooperates with a

shoulder on a pin for removably retaining the pin within the sleeve and is provided with an arcuate rest for the pin, the pin



having complementing surface which bears on the rest. The pin is fixed to a dental partial or full artificial denture.

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**3,787,976**

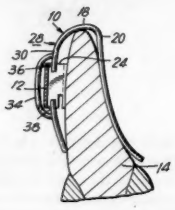
**CALIBRATED BRACKET SECURING MEANS**

**Howard Cohen, 339 Forest Ave., Woodmere, N.Y.**

**Filed May 30, 1972, Ser. No. 257,918**

**Int. Cl. A61c** *7/00*

**U.S. Cl. 32—14 A** **11 Claims**



Disclosed is a generally U-shaped securing device for engaging the labial or buccal, lingual, and incisal or inclusal surfaces of a tooth and locating and clamping thereto an orthodontic attachment of the type which may be affixed to a tooth by an adhesive or the like. Disclosed as well is the method of applying the same.

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**3,787,977**

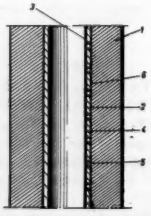
**DENTAL HANDPIECE OF STRAIGHT OR ANGLE TYPE**

**Gerhard Farian, and Willi Fink, both of Biberach/Riss, Germany, assignors to Kaltenbach & Voigt, Biberach/Riss, Germany**

**Filed Mar. 25, 1971, Ser. No. 128,035**

**Int. Cl. A61c** *1/10*

**U.S. Cl. 32—27** **10 Claims**



A bearing in a dental handpiece comprises a thin inner sleeve press-fitted in a thicker outer sleeve. The outer sleeve is porous and the inner sleeve impermeable, the inner sleeve having an axial groove with radial apertures leading from the groove to the outer surface of the inner sleeve to serve as channels for flow of lubricant from the outer sleeve to the inner surface of the inner sleeve.

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**3,787,978**

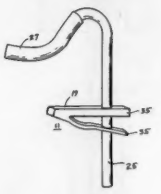
**SALIVA EJECTOR CHIN CLAMP**

**Winston L. Rogers, 7 Los Arbales, Orinda, Calif.**

**Filed Sept. 20, 1972, Ser. No. 290,566**

**Int. Cl. A61c** *17/04*

**U.S. Cl. 32—33** **3 Claims**



An adjustable chin clamp having a self locking arrangement designed inherent to the clamp for use with a saliva ejector.

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**3,787,979**

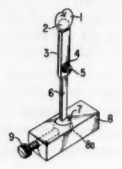
**ORTHODONTIC DENTAL STUDY MODEL**

**Raul Acevedo, Arzuaga No. 9, Rio Piedras, San Juan, P.R.**

**Filed Feb. 2, 1973, Ser. No. 329,047**

**Int. Cl. A61c** *19/00*

**U.S. Cl. 32—71** **5 Claims**



An orthodontic study device is provided wherein the position of each tooth may be universally adjusted. The tooth, in the form of a crown, is connected by a ball and socket joint to one end of a post which is secured at its other end to a supporting base plate. The post is in the form of elongated telescopic members whereby the height thereof may be adjusted. The post is secured to the base plate by a ball and socket joint whereby its position may be adjusted. Set screw means are provided to hold the telescoping members and the post in their adjusted positions. A selected number of devices and their crowns may be assembled in a dental arch formation with the crowns adjusted to desired positions to illustrate various spatial relationships of the teeth.

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**3,787,980**

**COMPASSES WITH RELEASABLE POINTS**

**Klaus Glombitza, Dallingerstrasse 17, 85 Nurnberg, Germany, assignor to J. S. Staedtler, Nurnberg, Germany**

**Filed Sept. 22, 1971, Ser. No. 182,700**

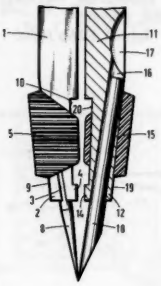
**Claims priority, application Germany, Oct. 29, 1970, P 20 53 253.0**

**Int. Cl. B43l** *9/24*

**U.S. Cl. 33—27 B** **1 Claim**

A needle point or pencil point is releasably fastened to a leg or branch of compasses in a receptacle slotted transversely to

the plane of relative movement of the two branches or legs, the receptacle being clamped about the point by sliding a plastic sleeve longitudinally of the metallic receptacle toward



a position of camming engagement between converging inner walls of the sleeve with converging outer walls of the receptacle, the angles of convergence being such that the sleeve is locked by static friction in the clamping position.

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**3,787,981**

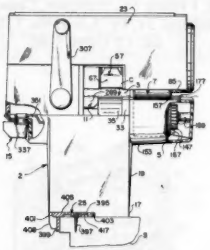
**FABRIC MEASURING AND COST COMPUTING APPARATUS**

**Steve Somogye, Jr., Jennings, Mo., assignor to The Measuregraph Company, St. Louis, Mo.**

**Filed Dec. 8, 1971, Ser. No. 205,883**

**Int. Cl. G01b** *5/04*

**U.S. Cl. 33—133** **11 Claims**



Apparatus for measuring out a length of fabric and for computing the cost of said length, having a measuring roller journalled for rotation on a horizontal shaft and a pressure roller resiliently contacting the measuring roller for gripping therebetween the fabric to be measured, the measuring roller rotating as the fabric is drawn between the rollers for driving indicating means which registers the length of the fabric measured out, and also for driving a cost computing double reel and web chart assembly for registering the cost of the fabric measured out. The apparatus has marking shears located in the vertical plane of the axis of the measuring roller permitting the true length of remnants to be directly registered by the indicating means. The cost computing chart assembly is removably carried by the apparatus for permitting quick removal of one chart assembly and replacement with another.

**3,787,982**

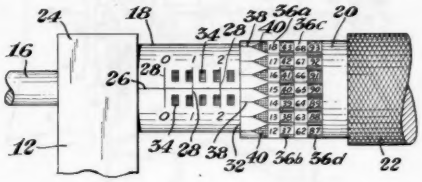
**DIRECT READING MEASURING INSTRUMENTS**

**Robert F. Anderson, 3613 13th St., Menominee, Mich.**

**Filed Apr. 28, 1972, Ser. No. 248,539**

**Int. Cl. G01b** *3/18*

**U.S. Cl. 33—166** **5 Claims**



An improvement in a measuring means for micrometers, verniers and the like, having measuring indicia positioned in a unique manner so as to cooperate during operation to provide fast and accurate direct measurement readings.

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**3,787,983**

**ROLLER SUPPORT AND DRIVE ARRANGEMENT FOR ROLLER TESTING DEVICES**

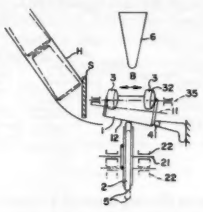
**Rudolf Diem, Schweinfurt, Germany, assignor to SKF Kugellagerfabriken GmbH, Schweinfurt, Germany**

**Filed Jan. 26, 1971, Ser. No. 109,807**

**Claims priority, application Germany, Jan. 30, 1970, P 20 04 240.4; Feb. 3, 1970, P 20 04 629.1**

**Int. Cl. B24b** *5/18; A61b 5/10*

**U.S. Cl. 33—174 Q** **14 Claims**



Support and drive means for use in apparatus for automatically inspecting the surface of bodies of rotation. The support means comprise a drive wheel and a plurality of rollers spaced therefrom. The body of rotation is arranged between the drive wheel and the rollers to rotate about its axis of rotation. Each of the rollers are independently mounted for free rotatary movement in contact with the surface of the body.

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**3,787,984**

**ADJUSTABLE BOW SIGHT**

**Fred B. Bear, and Owen E. Jefferey, both of Grayling, Mich., assignors to Victor Comptometer Corporation, Chicago, Ill.**

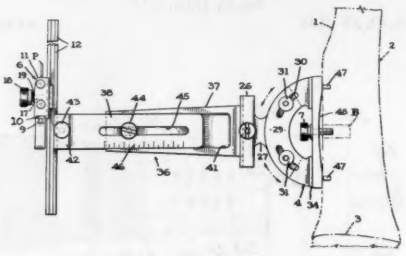
**Continuation-in-part of Ser. No. 68,425, Aug. 31, 1970, abandoned. This application Sept. 22, 1972, Ser. No. 291,324**

**Int. Cl. F41g** *1/00; F41b 5/00*

**U.S. Cl. 33—265** **8 Claims**

A bow sight is provided with a sight mount which is both vertically and transversely adjustable with respect to a sup-

porting bar. An anvil and base assembly serve to attach the support bar to an archery bow and include fastening means



permitting of both forward and lateral tilting of the support bar and its sight mount.

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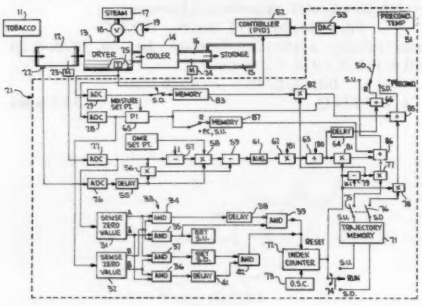
**3,787,985**

## DRYER CONTROL SYSTEM AND METHOD

**Ronald James Fowler, Columbus; Edward James Freeh, Worthington, and David Mark Koenig, Columbus, all of Ohio, assignors to Industrial Nucleonics Corporation, Columbus, Ohio**

**Filed Aug. 14, 1972, Ser. No. 280,114**
**Int. Cl. A24b** *9/20*; **F26b** *3/02, 17/32*
**U.S. Cl. 34—45** **11 Claims**



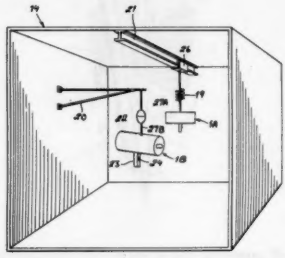
Moisture in tobacco flowing through a dryer is controlled so that it is maintained substantially at a desired amount during start up and shut down trasitional periods of the tobacco flow through the dryer. Trajectories for the dryer drying rate during the start up and shut down periods are provided in a computer memory. During start up, an indication of the moisture and flow rate of the tobacco flowing into the dryer is derived to enable the amount of moisture expected to be removed by the dryer (dryer duty) to be calculated. When shut down commences the temperature of the dryer is derived and stored in the memory. During start up, the trajectory and dryer duty are time weighted so that a weighting factor for the trajectory decreases as the transitional period progresses and a weighting factor for the dryer duty increases as the period progresses and the two time weighted indications are combined to control the dryer drying rate. During shut down, the shut down trajectory and stored drying rate indication are time weighted so that a weighting factor for the trajectory increases as the period progresses and a weighting factor for the drying rate indication decreases as the period progresses and the two time weighted indications are combined to control the drying rate of the dryer.

**3,787,986**

## BLOWER FOR VEHICLE-DRYING INSTALLATION

**Horst Burger, Neussass, Germany, assignor to Bowl, Bohler & Weber KG, Maschinenfabrik, Augsburg, Germany**

**Continuation of Ser. No. 854,431, Sept. 2, 1969, abandoned. This application Dec. 27, 1971, Ser. No. 219,592**
**Claims priority, application Germany, Aug. 30, 1969, 1780316; Oct. 14, 1969, 1809905**
**Int. Cl. F26b** *19/00*
**U.S. Cl. 34—229** **7 Claims**



A blower, designed particularly for use in the air drying of vehicular surfaces in car-washing stations, has a cylindrical housing formed at one end with an outlet slot for the discharge of an air stream generated by a fan mounted within the housing near the other end thereof. A liner of soundproofing material, such as foam plastic, extends from the vicinity of the fan toward the discharge end and defines a progressively narrowing air channel terminating at the outlet slot.

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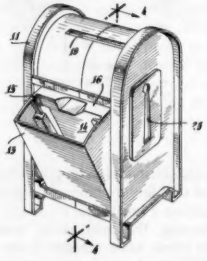
**3,787,987**

## TOY MAIL BOX

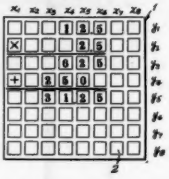
**Robert L. Brass, 1 Fillow St., Westport, Conn.**

**Filed Jan. 31, 1973, Ser. No. 328,475**
**Int. Cl. G09b** *3/00*
**U.S. Cl. 35—1** **7 Claims**



A toy mail box for developing the reading and manipulative abilities of a child. The toy includes several plastic blanks in the form of a letter, one of which is dropped into the upper slot of the mail box and a series of keys which correspond to each of the blanks. The child, by selecting the proper key, is able to open the mail box and remove the letter originally inserted into the box.

3,787,988
**METHOD AND ELECTRONIC MACHINE FOR TEACHING ARITHMETIC COMPUTATION**
Tohru Nakajima, and Masaaki Niiho, both of Tokyo, Japan, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo-to, Japan
Filed Dec. 30, 1971, Ser. No. 214,169
Int. Cl. G09b 19/02
U.S. Cl. 35—31 R 6 Claims



A method and machine for teaching students such as school children arithmetic computation. The machine has a display matrix provided with a plurality of display locations which can be selected by the student, and the student can select numerals to be displayed at selected display locations so that a given arithmetic problem can be set into the display matrix and the mental calculation performed by the student can be displayed to provide at the matrix an indication of a result to the problem as calculated by the student. An electronic structure automatically calculates the correct result to the problem introduced by the student, and at each stage of the computations performed by the student, as numerals selected by the student appear at the display matrix, there is an automatic indication of whether the correct calculations have been performed by the student, with the student also having the possibility of displaying the correct final result which may be compared with the result which the student has calculated.

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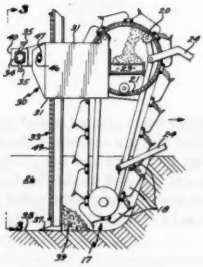
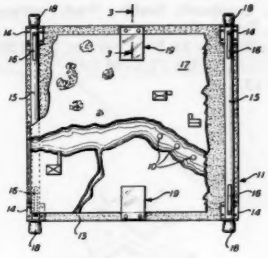
3,787,989
**TRENCHER WITH ADJUSTABLE STABILIZER BAR**
Loyd E. Heckathorn, Garden Grove, Calif., assignor to Towner Manufacturing Company, Santa Ana, Calif.
Filed July 17, 1972, Ser. No. 272,238
Int. Cl. E02f 3/12
U.S. Cl. 37—90 5 Claims



A trancher of the endless bucket or rotary wheel type has an adjustable crumbing stabilizer. The stabilizer is adjusted vertically by means of a chain and sprocket arrangement, the sprocket being fixed to the digger frame and the chain being fixed at both ends to the stabilizer. An hydraulic braking device is used to hold the stabilizer in adjusted position.

3,787,990
**STRIP-CHART HOLDER**
Frederick Silver, 430 Tillon Rd., South Orange, N.J.
Filed Mar. 3, 1972, Ser. No. 231,492
Int. Cl. G09f 11/29
U.S. Cl. 40—86 R 1 Claim



A holder for a roll-up strip-chart providing right side and left side rotatable rods for rolling up the strip-chart and transferring it from the right side to the left side of a board, the board being provided with a cork surface and overhanging stub-retainers to hold the strip-chart down, and a cork surface on the board that is receptive to the insertion of marker pins that may be inserted in the strip-chart to designate position and progress of the vehicle for which the chart is in use.

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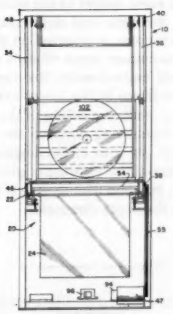
3,787,991
**AUTOMATED ANIMATED DISPLAY DEVICE**
Anthony Siksai, 2705 Lahser Rd., Bloomfield Hills, Mich.
Filed Oct. 17, 1972, Ser. No. 298,349
Int. Cl. 350 159; G09f 11/32
U.S. Cl. 40—106.52 10 Claims



A device for displaying and animating a plurality of transparencies in succession. A cabinet is provided with a polarizing light projection means located in its central section and an endless carrier for removing transparencies from a storage section to a viewing window and back to the storage section. A transfer section is provided so that the transparencies may be

moved to and from display and storage without interfering with the light projection. Animation is provided by a rotary polarizer, a stationary polarized sheet and transparencies carrying embossed motion lines.

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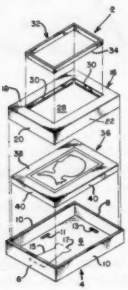
**3,787,992**
**DIMENSIONAL PICTURE FRAMES**
**Theodore C. Leonhardt, Seattle, Wash., assignor to O. K. Devin Inc., Seattle, Wash.**
**Filed July 24, 1972, Ser. No. 274,228**
**Int. Cl. G09f** *1/12*
**U.S. Cl. 40—152** **10 Claims**



This invention relates to a picture frame assembly adapted to afford a depth dimension to a picture mounted therein. The picture frame assembly includes a frame member having bottom and side walls, a mat member having a top containing a window opening and having downwardly depending inner and outer side walls telescopically arranged within the frame member, and picture mounting means having vertical support flaps arranged between the top and bottom walls, whereby a picture mounted on the picture mounting means may be viewed through the window opening. In a first embodiment, the support flaps of the picture mounting means extend upwardly and have the same height as the outer side walls of the frame member and the inner and outer side walls of the mat member, whereby a picture, supported on the picture support means, will have a maximum depth relation relative to the mat top wall. In a second embodiment, the support flaps extend downwardly and terminate at the lower extremity in engagement with the bottom wall, the height of the support flaps and the mat inner side walls being equal to the height of the mat and frame side walls. In both embodiments, a trim member may be mounted about the entire periphery of the window opening, said frame, mat and trim members having contrasting colors to emphasize the depth dimension.

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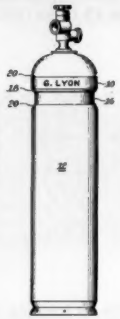
**3,787,993**
**COLORED CODED GAS CONTAINER BANDS**
**George E. Lyon, Florence, Ala., assignor to The Raymond Lee Organization, Inc., New York, N.Y., by said George Lyon**
**Filed Aug. 21, 1972, Ser. No. 282,605**
**Int. Cl. G09f** *3/00*
**U.S. Cl. 40—306** **1 Claim**

A container of gas used for industrial commercial or home use has an upstanding portion with two like circular grooves in its outer periphery which are disposed horizontally and are vertically displaced, the grooves being separated by a horizontal circular ridge. An identification band, coded to indentify the type of gas, is disposed in one groove to indicate that the




container contains a usable amount of gas and is disposed in the other groove to indicate that the container is empty. The band can also be reversed when moved from the one groove to the other.

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**3,787,994**
**FISH HOOK SETTER**
**Olen J. Love, Tulia, Tex., assignor to H. H. Malone and Gary Malone, both of Tulia, Tex., part interest to each**
**Filed Dec. 14, 1972, Ser. No. 315,185**
**Int. Cl. A01k** *97/12, 91/02*
**U.S. Cl. 43—15** **7 Claims**

A fish hook setter has a capped barrel attached to a fishing rod with a notched plunger extending through a keyhole slot in the cap. A clip on the end of the plunger is above a line guide eye on the rod so a pull on the fish hook pulls the end of the plunger down and disengages the notch in the keyhole slot so the plunger may be spring retracted into the barrel.

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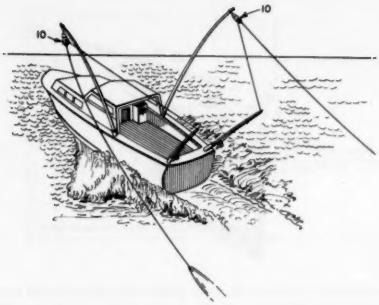
**3,787,995**
**OUTRIGGER LINE RELEASE**
**Mike Fukuichi Watanabe, P.O. Box 536, Paia, Hawaii**
**Filed June 22, 1972, Ser. No. 265,252**
**Int. Cl. A01k** *91/00*
**U.S. Cl. 43—43.12** **9 Claims**

A fishing line holding device to support a line from the end

of an outrigger pole while permitting easy adjustment of the line length. The device has a bifurcated body with a frangible




member such as a matchstick used to hold the line within the bifurcation.

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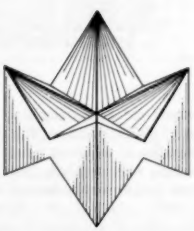
**3,787,996**

**TOY BLOCKS HAVING PANELLED CONSTRUCTION**

**John A. Smith, Mercerville, N.J., and Stephen A. Miller, New York, N.Y., assignors to Columbia Broadcasting System Inc., New York, N.Y.**

**Filed Aug. 15, 1972, Ser. No. 280,835**
**Int. Cl. A63h** *33/08*
**U.S. Cl. 46—25** **13 Claims**



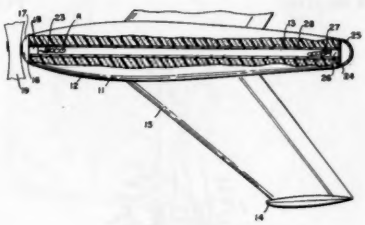
A construction toy which includes a plurality of similarly contoured molded plastic blocks that can be arranged in inverted triangles and other top heavy constructions. Each block comprises an outer shell of generally cubical shape with each of the end opposing surfaces having a pair of crossed V-shaped notches of right angular shape, the notches extending completely across the block so that the side surfaces of the shell are hourglass-shaped. Four triangular panels extend from the side edges of the shell and intersect at the center thereof, the exposed edges of the panels being oriented and dimensioned to lie in the planes defining the crossed V-shaped notches at both ends of the block. In a preferred embodiment of the invention, four elongated rectangular panels extend from the neck portions of the hourglass-shaped side surfaces of the shell and intersect the center of the shell. The invention particularly lends itself to being injection molded in a single-cavity mold.

**3,787,997**

**MODEL AIRPLANE STRUCTURES**

**Jerome H. Lemelson, 85 Rector St., Metuchen, N.J.**

**Filed July 6, 1971, Ser. No. 160,005**
**Int. Cl. A63h** *27/00*
**U.S. Cl. 46—78** **10 Claims**



A rubber band powered model airplane is provided having an elongated body made substantially entirely of a lightweight expanded, cellular plastic. A passageway extends completely through the elongated body to accommodate a rubber band motor. In one form, the passageway is lined with a thin walled, non cellular tube of substantially greater rigidity than the material comprising the body. The tube serves to both longitudinally reinforce the body, and retain the nose and tail fittings for the propellor and rubber band motor.

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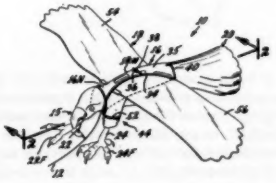
**3,787,998**

**GLIDING TOY**

**Eugene J. Kilroy, Jr., Inglewood; Philip B. Du Breuil, Redondo Beach, and Scott C. Dennison, Van Nuys, all of Calif., assignors to Mattel, Inc., Hawthorne, Calif.**

**Filed Jan. 16, 1973, Ser. No. 324,039**
**Int. Cl. A63h** *27/00*
**U.S. Cl. 46—79** **7 Claims**



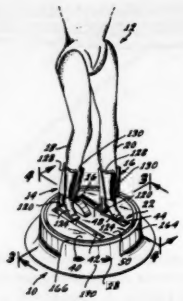
A combination glider and kite that can be towed to make it gain altitude and then detached from the tow line so it glides to the earth. The glider is in the shape of a bird, and has heavy bird-like legs extending downwardly and forwardly from the body, to move the center of gravity forwardly and downwardly so as to increase the glider stability, the legs also serving as a landing gear. A tow line is attached by a clip to the body of the glider, the clip having resilient arms that separate to detach from the body when the tow line is jerked hard after the glider has reached a high altitude.

3,787,999

## COMBINATION FIGURE AND WALKING SIMULATOR WITH MEANS FOR SWIVELLING SAID FIGURE

Ian F. Ayton, Palos Verdes Estate; Donald C. Hartling, Huntington Beach; Joseph Kossoff, Hawthorne, and Brian G. Osborne, Manhattan Beach, all of Calif., assignors to Mattel, Inc., Hawthorne, Calif.

Filed Jan. 7, 1972, Ser. No. 216,086
Int. Cl. A63h *11/10*
U.S. Cl. 46—110 7 Claims



Foot clips receive doll's feet for reciprocating them by a drive connected to the foot clips and including a wheel which is swivelled by a mounting ring grasped and pushed to move the device over a supporting surface.

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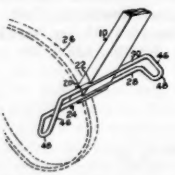
3,788,000

## HOOP PUSHING TOY

Joe H. Jenkins, Franklin, Ark., assignor to Robert Clay and Kenneth F. King, both of Hardy, Ark., part interest to each

Filed Aug. 14, 1972, Ser. No. 280,148
Int. Cl. A63h *33/02*
U.S. Cl. 46—205 7 Claims



A wooden or other elongated body has one end acting as a handle and its other end provided with a transversely extending hoop engaging element formed of bent wire provided with loops at the ends of the portion projecting from the stick; the wire is relatively heavy and stiff and has portions adjacent the stick seating in grooves therein to assist in anchoring it, and the extremities of the wire body extend through openings in the stick and are fixed by headed tubular rivets driven through the top face of the stick to grip the edges of ribs formed on the wire extremities.

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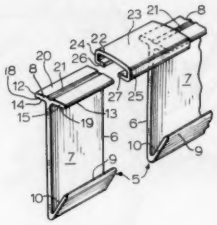
3,788,001

## LAWN EDGING STRUCTURE

Glenn F. Balfanz, Jr., Hampton Ave., Western Springs, Ill.

Filed June 12, 1972, Ser. No. 262,117
Int. Cl. A01g *1/08*
U.S. Cl. 47—33 7 Claims

A plastic extruded lawn edging comprising a T-section including vertical wall and a wide transverse upper head portion which extends inwardly of the wall toward the flower bed and outwardly toward the grass and provides a shade area to prevent the growth of vegetation. In one embodiment a C-shaped connector interconnects the ends of adjacent sections.



Another embodiment utilizes a connector which bridges the wall portion of adjacent sections and is slidably fitted between the head of the T and an angled anchor flange at the bottom of the walls.

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3,788,002

## SEEDLING TRAY INSERT

Michael B. Suchka, Clinton, Ohio, assignor to Lakeland Enterprises Inc., Lakeland, Fla.

Filed Mar. 13, 1972, Ser. No. 233,965
Int. Cl. A01g *9/02*; B65d *1/36, 5/48*
U.S. Cl. 47—34.13 3 Claims

A collapsible insert for a seedling tray formed integrally from a single sheet of plastic material. The insert, in the folded position, has a plurality of adjacent parallel U-shaped channels each having a base with integrally folded sides. A plurality of integrally formed longitudinally spaced transverse dividers extend across each channel to form compartments therebetween. The sides of adjacent channels have the free longitudinal edge thereof integrally united for accordion folding. Pull tabs are provided on the edges of the farthest spaced sides. Upon removal of the folded insert from the tray and manual application of tension to the tabs, the sides of each channel fold open to become planar with the base and the dividers rotate with the sides about the folds, thus collapsing the compartments in each channel for enabling easy removal of seedlings.

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3,788,003

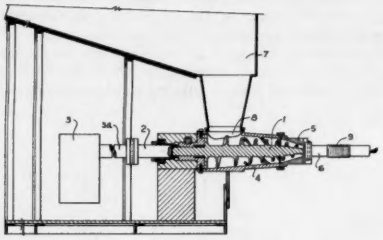
## SEEDLING CONTAINER

Stephen Mark Creighton; David Lawrence Mitchell, and William Chee Kay, all of Edmonton, Alberta, Canada, assignors to Research Council of Alberta, Edmondson, Alberta, Canada

Filed July 19, 1971, Ser. No. 163,810
Int. Cl. A01c *1/04*
U.S. Cl. 47—56 2 Claims

Peat and water are mixed to form a thick paste which is extruded into a plastic film casing. The casing and filling are

sliced into short, open-ended units. The units provide containers in which seedlings can be grown. When the seedlings



are to be planted, the casing is perforated or shredded with a knife and the peat plug and seedling root ball buried together.

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**3,788,004**

**SYSTEMS FOR OPENING AND CLOSING ACCESS APERTURES IN THE OUTER WALLS OF TANNERY PADDLE TUMBLES AND THE LIKE**

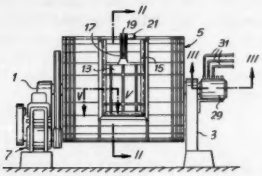
**Tullio Billeri, and Fulvio Billeri, both of Firenze, Italy, assignors to Billeri Riccardo & Figli S.n.c., Firenze, Italy**

**Filed Feb. 28, 1972, Ser. No. 229,795**

**Claims priority, application Italy, Mar. 10, 1971, 9406 A/71**

**Int. Cl. E06b** *3/34;* **E05f** *15/08*

**U.S. Cl. 49—41** **3 Claims**



The invention provides systems for opening and closing access apertures in the outer walls of tannery paddle tumblers and the like. The system consists of a door which is slid in guides, the movement of the door being controlled by a fluid motor and fluid control. The movement of the door is effected by the fluid motor which moves a rack attached to the door. Means for providing a seal between the door and the access aperture are also described.

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**3,788,005**

**WINDOW REGULATOR MECHANISM**

**Chris Mistopoulos, Jr., Detroit, Mich., assignor to Ford Motor Company, Dearborn, Mich.**

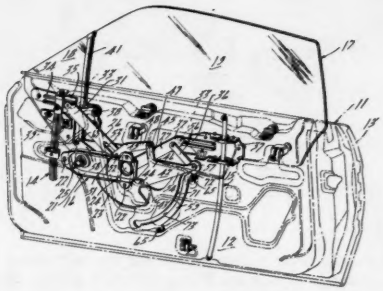
**Filed Feb. 12, 1973, Ser. No. 331,929**

**Int. Cl. E05f** *5/12*

**U.S. Cl. 49—103** **16 Claims**

A window regulator mechanism adapted to lower or raise a window panel into and out of a window well between vehicle body panels, the window panel being vertically divided into separately movable ventilation and visibility sections. With the window panel in raised condition, the mechanism first may be actuated to lower the ventilation section into the window well to provide a ventilation exhaust opening in the vehicle body and then, if desired, further actuated to lower the visibility section into the window well. From a lowered condition, the sequence of movements to raise the panel sections is reversed.

Movement of the panel sections is controlled by a series or train of links effective to transmit movement of a gear sector to the window regulator arms coupled to the respective ventilation and visibility sections. Each train of links is controlled



by a cam follower movable in a cam slot in a respective cam plate. The cam slots are programmed to permit or restrain vertical movement of the panel sections in a desired sequence in window panel lowering or raising directions.

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**3,788,006**

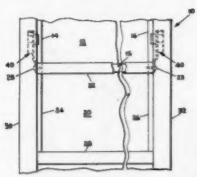
**SELF-RELEASING FRICTIONAL WINDOW SASH BALANCE**

**Claude Teggelaar, and William T. De Bruyn, both of Grand Rapids, Mich., assignors to Wolverine Industries, Inc., Grand Rapids, Mich.**

**Filed Feb. 16, 1972, Ser. No. 226,786**

**Int. Cl. E05d** *13/08*

**U.S. Cl. 49—417** **16 Claims**



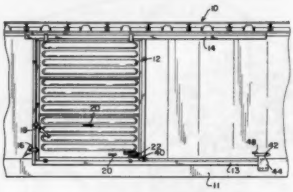
A shoe having a tapered aperture between resilient side walls which include friction pads on their outer surfaces has a size and shape to fit within the jamb channel. The shoe is mounted to the edge rail of a movable window sash by means of a bracket-retainer unit which movably retains a tapered resilient member within the tapered aperture of the shoe such that as the window is moved upward, the resilient tapered material moves relative to the tapered aperture in the shoe to minimize the force exerted by the shoe pads against the window jamb. When the window is stationary, however, the weight of the window causes the resilient tapered material to move relative to the side walls to forcibly engage them and push the associated pads against the sides of the jamb thereby holding the window in any desired raised position by the resulting frictional force between the pads and the sides of the jamb channel. The bracket-retainer can be adjusted to increase or decrease the frictional holding force as required in different installations, and the bracket is resiliently flexible to facilitate removal of the sash from its jamb.

**3,788,007**

## FREIGHT CAR DOOR LATCHING DEVICE

**John D. Bailey, Orland Park, Ill., assignor to Pullman Incorporated, Chicago, Ill.**

**Filed Apr. 26, 1972, Ser. No. 247,644**
**Int. Cl. E05d** *13/04*
**U.S. Cl. 49—449** **8 Claims**



A pivoted latch is positioned at the end of a sliding door supporting guide rail and engageable with a door mounted cooperating hook part to lock a sliding door of a freight car in the fully open position. A door mounted unlocking lever is positioned adjacent a door pusher block to thereby unlock the door from the open position when the pusher block is engaged by fork of a lift truck which may be used to push the door closed.

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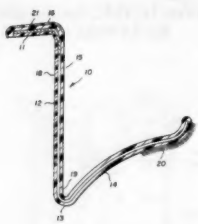
**3,788,008**

## BELT LINE WEATHER SEAL

**Charles Yackiw, Fairport, and Fred Williams, Pittsford, both of N.Y., assignors to The Schlegel Manufacturing Company, Rochester, N.Y.**

**Filed Oct. 4, 1972, Ser. No. 294,944**
**Int. Cl. E06b** *7/22*
**U.S. Cl. 49—496** **7 Claims**



A belt line weather seal uses a spring metal core having spaced apart fingers that extend around the curve of the seal and into its resilient arm, and a plastic material covers the metal core and extends from the top of the seal to the tip of the resilient arm. The plastic is preferably relatively rigid in the portion of the seal that is fixed in place and is relatively flexible in the curve and the resilient arm. A pile material covers the glass-engaging outer region of the resilient arm.

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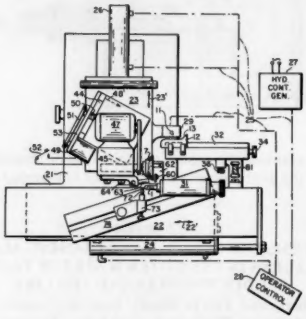
**3,788,009**

## CONTROLLED TOOL FOR MACHINING COMPOUND SURFACES

**Thurston V. Williams, Wilton, and Leo H. Cheever, South Lyndeboro, both of N.H., assignors to The O.K. Tool Company, Inc., Milford, N.H.**

**Division of Ser. No. 143,557, May 14, 1971, Pat. No. 3,713,254. This application Jan. 12, 1973, Ser. No. 323,112**
**Int. Cl. B24b** *53/02*
**U.S. Cl. 51—5** **8 Claims**

A machine tool with a wheel for precision grinding of a ball end mill with cylindrically surfaced lands and a hemispherical end includes a template conforming to the lands and ball end mounted on a hydraulic driven workpiece table on which the ball end mill is held in a rotatable chuck. The grinding wheel is mounted on another hydraulically driven table, relative movement of the tables being hydraulically controlled by a stylus which senses the template. During grinding the ball end mill is supported and rotated by a finger mounted on the grinding wheel table which engages in the flutes between the lands of the ball end mill closely adjacent the wheel. The wheel grinds along the lands and then as grinding continues around the ball




end a sliding block supporting the finger engages a stop on the workpiece table and retracts the finger from the path of the wheel around the ball end. To maintain the same spacial relation between the wearing edge of the wheel and the ball end mill as the stylus has with the workpiece template, the wheel is dressed with a truing tool on the workpiece table under the control of a dressing template. The grinding wheel is first advanced toward the truing tool by a stepping motor independently of the hydraulic table drive so that when the wearing edge is trued, the original spacial relationship of wearing edge and ball end mill is restored.

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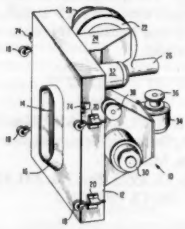
**3,788,010**

## APPARATUS FOR TREATMENT OF VERTICALLY DISPOSED SURFACES

**James R. Goff, Oklahoma City, Okla., assignor to Robert T. Nelson, Oklahoma City, Okla.**

**Filed Feb. 28, 1972, Ser. No. 229,842**
**Int. Cl. B24c** *3/06*; **B24b** *55/06*
**U.S. Cl. 51—9** **14 Claims**



A portable airless blasting head suitable for treatment of vertically disposed surfaces is described. The blast head comprises in combination an enclosure with an opening in one side adapted to contact the surface to be treated, projecting means within the enclosure for directing a stream of particulate abrasive material through the opening in the enclosure onto the surface to be treated, a resilient sealing means around the

boundary of the opening in the opening of the enclosure which contacts the surface to be treated and retains the abrasive material in the apparatus, and a recirculation means to return the particulate abrasive material to the projecting means. Advantageously the apparatus of the present invention is self-propelled.

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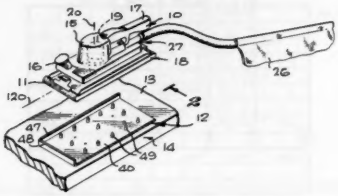
**3,788,011**
**PIERCING OF AIR SUCTION HOLES IN ABRASIVE SHEET MATERIAL**

**Alma A. Hutchins, 49 North Lotus Ave., Pasadena, Calif.**

**Filed Aug. 21, 1972, Ser. No. 282,155**
**Int. Cl. B24b** *23/00*
**U.S. Cl. 51—170 R** **10 Claims**



Apparatus including a portable sander having a power driven shoe adapted to carry a sheet of sandpaper or the like and containing suction holes through which air and abraded particles are drawn by suction to a collection bag, and a coacting piercing tool adapted to punch suction holes in a sheet of sandpaper carried by the shoe when the sander and piercing tool are moved relatively toward one another.

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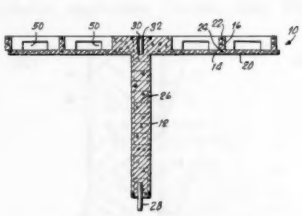
**3,788,012**
**MODULAR BUILDING STRUCTURE ELEMENTS OF SLABS WITH CENTRAL SUPPORT POSTS**

**Steven Arnold, Westfield, N.J., assignor to Arnold Associates, Inc., Westfield, N.J.**

**Continuation-in-part of Ser. No. 71,636, Sept. 14, 1970, abandoned. This application Feb. 22, 1972, Ser. No. 227,855**
**Int. Cl. E04b** *5/43*
**U.S. Cl. 52—73** **16 Claims**



A prefabricated element for modular building structures which comprises a column carrying at its top end a slab composed of a ceiling plate and a grid of joists integral with the ceiling plate and extending upwardly therefrom. The slab resembles an upside-down waffle type floor. The column is connected to a central portion of the slab such that the ceiling plate, which is at the bottom of the slab, takes compressive stresses and the joists, which are above the ceiling plate, take tensile stresses. The bottom end of the column is provided with a downwardly extending pin, and the slab is provided at its center with an opening adapted to receive the pin to allow for convenient and accurate vertical stacking of pluralities of structural elements. The slab may be square or rectangular, and may be provided at its lateral sides with connecting elements for attaching together adjacent slabs of different structural elements to form a load bearing building structure. A structural element comprising a column and a slab integral therewith may be prefabricated and transported to the construction site in one piece. Alternately, a modified column having a mushroom-shaped cap, and a modified slab having a conforming opening adapted to receive the mushroom cap, can be preformed separately, and may be transported to the construction site separately and assembled there.

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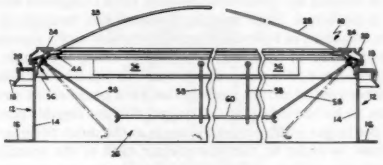
**3,788,013**
**DROP AWAY FIRE VENT**

**James C. Veen, Jr., Grand Rapids, Mich., assignor to Hillsdale Industries, Inc., Grand Rapids, Mich.**

**Filed June 7, 1972, Ser. No. 260,436**
**Int. Cl. E05f** *15/20*
**U.S. Cl. 52—1** **17 Claims**



A fire vent having a closure panel or partition which normally closes a tubular vent chamber or passage defined by an annular frame, with a support means for normally holding the closure in place, even against direct loading, but which collapses in response to the presence of heat, as from a fire, to drop the closure out of the way and open up the tubular chamber and thus provide a vent.

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**3,788,014**
**ROOF**

**Gunter Semisch, Solingen/BRD, Germany, assignor to Firma August Steingass & Sohn, Solingen, Germany**

**Filed Sept. 13, 1972, Ser. No. 288,500**
**Claims priority, application Germany, Sept. 15, 1971, P 21 46 029.7**
**Int. Cl. E04b** *7/10*
**U.S. Cl. 52—18** **8 Claims**

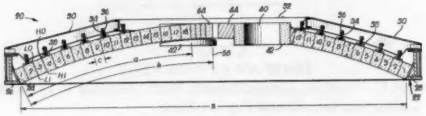
A roof for auditoriums, stadiums, et cetera, with a circular ground plan or a ground plan similar to a circle, which has a frustum or a trough-shaped roof ring with roof sheeting inclined downwards and inwards and which consists of an outside supported pressure ring and an inner pull ring and of pull elements connecting the pressure and pull rings.

3,788,015

## DESIGNING AND BUILDING FURNACE STRUCTURES WITH SINGLE SIZE BRICK

John J. Musser, Kansas City, Mo., assignor to Geo. P. Reintjes Co., Inc., Kansas City, Mo.

Filed Feb. 5, 1970, Ser. No. 8,781
Int. Cl. E04b 1/32; F23m 5/02
U.S. Cl. 52—80 10 Claims



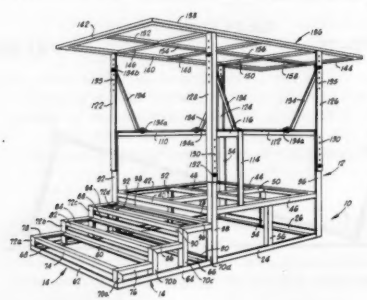
An electric furnace roof or other generally circular structure is formed by concentric rows of bricks disposed side by side in each row. Each brick is the same size throughout the entire structure or individual sections thereof and is tapered to present a pair of opposed, non-parallel sides, the single size being determined in accordance with the innermost radius of the inner row to permit such radius, or a preselected smaller radius, to be turned by bricks oriented in the regular position with the larger width across the taper at the outer periphery of the row. In order to turn the greater radii of the remaining, outer rows, certain of the bricks in each row are reversed to place the larger width at the inner periphery of the respective row. The number of reversed brick in each row is determined mathematically by initially assuming the existence of imaginary reversed bricks expanded in size to equalize the widths of all bricks, both real and imaginary, of a given row at the outer periphery thereof. A digital computer is programmed to provide output including the numbers of brick or each row in both regular and reversed positions, from input comprising design dimensions and conditions of the structure to be built.

3,788,016

## PORTABLE PORCH UNIT FOR MOBILE HOMES

John Richardson, P.O. Box 291, Shattuck, Okla.

Filed May 17, 1972, Ser. No. 253,959
Int. Cl. E04b 7/16; E04f 11/00
U.S. Cl. 52—66 1 Claim



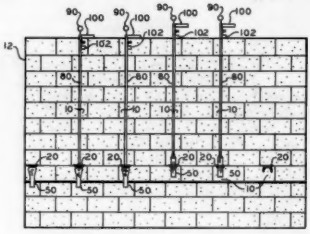
A portable porch unit for mobile homes comprising a step assembly including hand rails at opposite sides of a plurality of ascending steps, a porch, a porch supporting substructure assembly forming a rectangular enclosure and having a hinged door providing access to the interior of the enclosure and positioned at, and forming a portion of, one side of the porch, and a canopy assembly adjustably supported above said porch for vertical adjustment with respect thereto.

3,788,017

## MORTER DEBRIS CLEANOUT APPARATUS

Charles E. Bachus, 1961 Alexander Dr., Escondido, Calif.

Filed June 5, 1972, Ser. No. 259,583
Int. Cl. E04g 21/20; E04f 17/10
U.S. Cl. 52—122 6 Claims



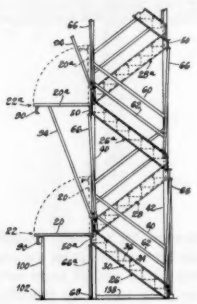
A morter debris collecting bag is supported in a vertical passage in a masonry block wall formed by vertically aligned holes in the blocks in which vertical reinforcing rods are to be installed. A metal frame with hooks supports the bag. The frame funnels debris into the bag which is belled. The bag has a drawstring and is withdrawn by a pole having extendible-retractable hooks at its lower end used to engage the drawstring.

3,788,018

## PREFABRICATED MULTI-STORY STAIR ASSEMBLY

Smith H. Simmons, Largo, and Mitchell R. Caraway, Tampa, both of Fla., assignors to The Standard Fabricated Products Co., Clearwater, Fla.

Filed May 13, 1971, Ser. No. 143,115
Int. Cl. E04f 11/02
U.S. Cl. 52—185 8 Claims



A prefabricated multi-story stair assembly in which the supporting members are all confined within the stair unit and which includes means for leveling the stair unit in its pre-installed arrangement and in which the platforms are pivotally mounted on the prefabricated stair unit for rocking movement between an unobstructed raised position to normal horizontal position to form the landing.

3,788,019

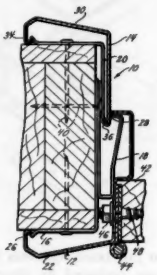
## ADJUSTABLE METAL DOOR FRAME CONSTRUCTION

Donald L. Kiselewski, Palm Beach Gardens, Fla., assignor to The Binkley Company, Warrenton, Mo.

Filed Nov. 22, 1971, Ser. No. 201,125

Int. Cl. E06b *1/20*

U.S. Cl. 52—212 7 Claims



There is disclosed a novel adjustable metal door frame construction incorporating opposed telescoping frame and trim units which are mounted and retained in a door opening by retainer clips which are secured in predetermined positions. Each of the frame and trim units is independently snapped onto a set of clips and is maintained thereby against removal. The door may be pre-hung in the frame unit, if desired. The telescoping relationship of the frame and trim units permits use of the construction with a predetermined range of wall widths.

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3,788,020

## FOAMED PLASTIC CONCRETE FORM WITH FIRE RESISTANT TENSION MEMBER

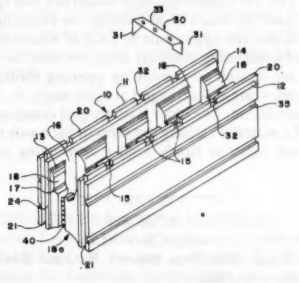
Werner K. H. Gregori, Oakville, Ontario, Canada, assignor to Roher-Bohm Limited, Nassau, Bahamas

Continuation-in-part of Ser. No. 770,233, Oct. 24, 1968, Pat. No. 3,552,076, which is a continuation-in-part of Ser. No. 580,912, Sept. 21, 1966, abandoned, which is a continuation-in-part of Ser. No. 569,908, Aug. 3, 1966, abandoned. This application May 12, 1969, Ser. No. 823,800

Claims priority, application Canada, Mar. 22, 1966, 955,523

Int. Cl. E04b *2/20*; E04c *2/20*

U.S. Cl. 52—309 18 Claims



A self-supporting concrete form of foamed polymeric material to be left in place to provide insulation for a wall the form having two side walls joined by transverse tension members of sheet metal or other thin fire resistent material. The tension members are embedded in projections provided on inner faces of the two walls to provide substantially cylindrical vertically disposed cavities for concrete. The upper and lower edges of the tension members and projections are inwardly spaced from associated edges of the two side walls so that a horizontally disposed concrete beam will also be provided when the form and adjacent similar forms are filled with liquid concrete.

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3,788,021

## INTERCONNECTION SYSTEM FOR STRUCTURAL ELEMENTS

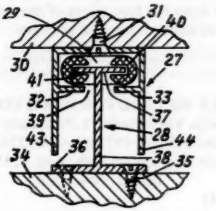
Balthasar Husler, Olten, Switzerland, assignor to Alphons Glutz-Blotzheim A.G., Solothurn, Switzerland

Filed Dec. 22, 1971, Ser. No. 210,933

Claims priority, application Switzerland, Jan. 8, 1971, 251/71

Int. Cl. E04b *2/32*

U.S. Cl. 52—403 3 Claims



To interconnect structural elements, such as walls, wall studs, door frames and the like and permit relative movement of the interconnected elements, for example due to differential expansion upon temperature or humidity changes, the elements to be interconnected are formed with matching projections and recesses which are shaped to be interlocked, and a liner, or layer of insulating material, such as plastic, fibrous material, felt or the like, preferably fire resistant, is located between the interlock projections and recesses; in one form, the projections are formed as longitudinal rails, secured for example by screws to one of the members, the recess being either formed in the other member, or being provided by an interlocking longitudinal rail, the two elements being slid against each other. The liner itself may be an elastomer which is stretched, so as to reduce its cross section during insertion, and, after having been located, reverts to its normal size and thickness, thus securely locking the elements together. The projecting elements may be divergent, in cross section V-shaped units which engage in converging sections, the divergent units being resiliently deformable to snap into the converging recess. To hold the parts securely together, a spacer can be located in the divergent section after assembly.

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3,788,022

## ELEMENT FOR BRIDGING THE JUNCTURE BETWEEN ADJACENT STRUCTURAL COMPONENTS

Helmut Epperlein, Dietersweiler, and Edgar Hoscheler, Freudenstadt, both of Germany, assignors to Christian Holzapfel K.G., Horb/Neckar, Germany

Filed May 12, 1972, Ser. No. 252,675

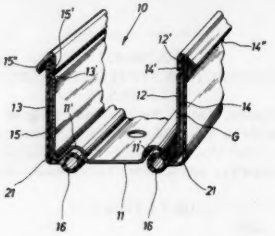
Claims priority, application Germany, May 28, 1971, 2126647

Int. Cl. E04h *1/12*

U.S. Cl. 52—403 10 Claims

A U-shaped member has a bight portion and two wall portions which extend to one side of the bight portion normal thereto. The outer side of the bight portion is formed with two open channels extending along the juncture with the respec-

tive arm portion. Two sealing strips of elastomeric material are provided, each overlying the outer side of one of the arm portions and connected to the free edge of the same, with each sealing strip extending around the juncture of the arm portion



with the bight portion having a tubular bead received in part in the associated channel. Sealing lips are provided on and extend outwardly from the free edges of the sealing strips in the region of the free edges of the arm portions.

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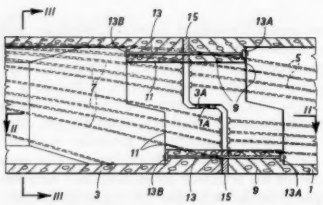
**3,788,023**
**ASSEMBLY METHOD FOR BEAM STRUCTURES**
**Romualdo Macchi, Via S Paolo 31, Pisa, Italy**
**Filed July 28, 1972, Ser. No. 276,022**
**Claims priority, application Italy, Aug. 2, 1971, 9633/71**
**Int. Cl. E04c** *3/26*
**U.S. Cl. 52—741** **10 Claims**



A beam structure for a viaduct is disclosed in which hollow beams of reinforced concrete are joined in end to end relationship. The end portion of each beam has an internally extending flange in which the reinforcing members of the beam are anchored. Adjacent beams are inter-connected by reinforcing cables extending across the join and embedded in the adjacent flanges of the beams. The reinforcing cables and members together act to place each flange under compression. A hardenable mass injected between adjacent beams is also placed under compression by the reinforcing cables joining the two beams and provides a continuous beam structure.

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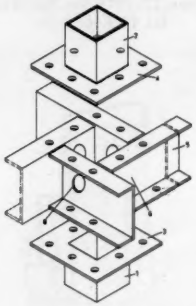
**3,788,024**
**OPEN FRAMEWORK, ESPECIALLY FOR BUILDING PURPOSES**
**Jan F. De Hartog, Achterom, Netherlands, assignor to Fokker V.F.W. N.V., Schiphol-Oost, Netherlands**
**Filed Oct. 15, 1971, Ser. No. 189,599**
**Claims priority, application Netherlands, Dec. 18, 1970, 7018477**
**Int. Cl. E04b** *1/24*
**U.S. Cl. 52—648** **5 Claims**

Open framework with vertical columns and horizontal girders or supporting beams with junctions, showing an interconnection between two coaxial columns and up to four girders, whereby the end of each column is provided with a transverse flange, the end of each girder belonging to the junction point being taken up between the flanges of two adjoining columns in such a way that each end forms one side of a rectangle or a



square, and that for junctions with less than four girder ends the missing ends are replaced by short girder sections for completing the rectangle.

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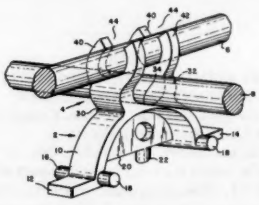
**3,788,025**
**CHAIR SUPPORT FOR REINFORCING RODS**
**Stannard D. Holmes, P.O. Box 331, Naranjito, P.R.**
**Filed May 17, 1972, Ser. No. 254,132**
**Int. Cl. E04c** *5/16*
**U.S. Cl. 52—685** **1 Claim**



A chair for supporting in right angular relation two reinforcing rods used in construction of concrete slabs has a lower arched base part and an upper rod supporting part integral with the base. The base is an arched structure with means for providing lateral, longitudinal and vertical support and strength. The rod supporting part comprises two spaced arms the lower parts of which form a saddle for receiving one reinforcing rod and the upper part of each of which is formed by two spaced upstanding inwardly concave arms the upper ends of which are spaced to provide an opening through which a second reinforcing rod arranged at right angles to the first rod may be introduced. The chair is of integral construction and is formed of a material causing the arms of each pair to be biased toward each other to firmly hold a reinforcing rod between them.

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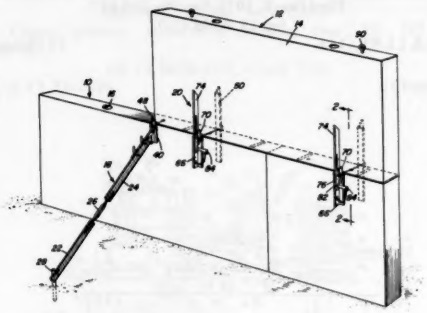
**3,788,026**
**STACK-WALL**
**James J. Cook, 200 Penn Square National Bank Building, Oklahoma City, Okla.**
**Filed Mar. 10, 1972, Ser. No. 212,290**
**Int. Cl. E04g** *21/18, 21/22*
**U.S. Cl. 52—127** **7 Claims**

A masonry wall construction of a plurality of preformed modules employed in lieu of conventionally used concrete block, brick or clay masonry wall structures. Knee braces are

provided for properly aligning the first course of modules and subsequent courses are set in a bed of mortar and properly aligned and positioned by the use of brackets and ties and



each module is set in place by a crane or other suitable lifting and manipulating device by engagement with eyebolts provided for erection only.

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**3,788,027**

**PROCESS FOR COLLECTION AND TREATMENT OF GARBAGE**

**Jorge Galvez Figari, Enrique Larreta St. No. 12, Madrid, Spain**

**Filed Apr. 17, 1972, Ser. No. 244,924**

**Int. Cl. B65b** *1/24*

**U.S. Cl. 53—24** **5 Claims**

A process for the collection, treatment and disposition of domestic garbage, wherein the garbage is dehydrated in a hydraulic press to remove excess fluids therefrom, and the dehydrated garbage is hermetically sealed in compact cases for subsequent transportation and handling. The containers are formed in two parts, one of which is placed in the cyclinder end of a ram-type press and the other in the piston end so that the garbage is compressed and dehydrated between the two parts of the container. Pressing the garbage together brings the two sections of the container into interlocking, sealing engagement so that one compression stroke of the press compresses and hermetically seals the garbage in the containers.

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**3,788,028**

**DEVICE FOR PACKING MACHINES**

**Bertil Folkesson; Lennart Nilsson, both of Lund, and Uno Sjostrand, Malmo, all of Sweden, assignors to Tetra Pak Developpment SA, Lausanne, Switzerland**

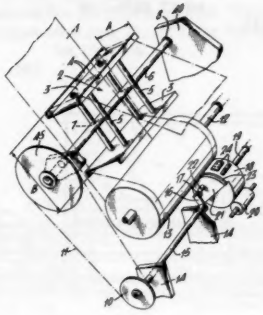
**Filed Oct. 24, 1972, Ser. No. 300,251**

**Claims priority, application Sweden, Nov. 25, 1971, 15079/71**

**Int. Cl. B65h** *25/20, 57/00*

**U.S. Cl. 53—51** **5 Claims**

A rotatable device operable by engagement with spaced, transverse creases in a longitudinal, moving web of packaging material, said device controlling means for performing an



operation such as printing information on or punching holes in the web at specific places relative to the transverse creases.

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**3,788,029**

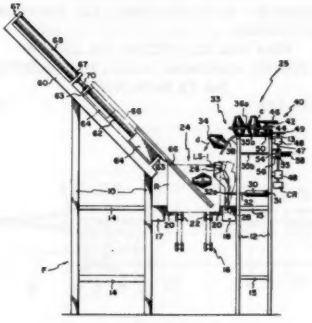
**TUMBLE PACKING APPARATUS**

**Charles F. Pokorney, Oak Lawn, Ill., assignor to Koehring Company, Milwaukee, Wis.**

**Filed July 28, 1972, Ser. No. 276,068**

**Int. Cl. B65b** *57/06, 5/00*

**U.S. Cl. 53—59** **5 Claims**



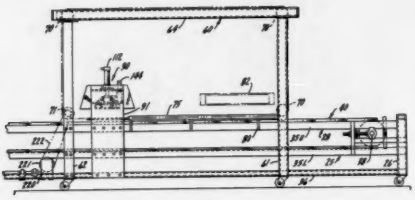
Tumble packing apparatus for filling a case with containers such as damageable, liquid-filled, lightweight plastic containers and the like including: apparatus for discharging containers in a free fall path of travel to a container case, and a cushioning pad which is selectively movable from a removed position into the path of initially charged, free falling containers to temporarily interrupt and cushion the free fall travel of the initial charge of containers before they impact the container case. Mechanism is provided to remove the pad, after a predetermined number of containers have been cushioned, to permit the initial charge of containers to move to a final position within the case and cushion the immediately following containers which fall to fill the case.

3,788,030

## PIZZA PROCESSING MACHINE

Roy Virgil Moline, Duluth, Minn., assignor to Jeno's, Inc., Duluth, Minn.

Filed Apr. 12, 1972, Ser. No. 243,320
Int. Cl. B65b 5/08
U.S. Cl. 53—123 13 Claims



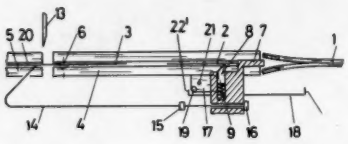
A method of processing a frozen pizza food product and a machine for performing the process. The pizza is cut into a plurality of sections while it is frozen and its temperature lowered to 20° to 24° F. A plurality of cutting knives on a cutting head cyclically cut the frozen pizzas into pie-shaped segments. The individual pizza segments are kicked out radially into a tray below the cutting die as each pizza is segmented. The machine then crimps a cover onto the tray and ejects the tray.

3,788,031

## DEVICE FOR THE FRAMING OF PHOTOGRAPHIC SLIDES

Peter Florjancic, St.-Martinstrasse 12, Garmisch-Partenkirchen, Germany

Filed Mar. 22, 1972, Ser. No. 236,899
Claims priority, application Austria, Mar. 26, 1971, 2625/71
Int. Cl. B65b 39/12
U.S. Cl. 53—123 13 Claims



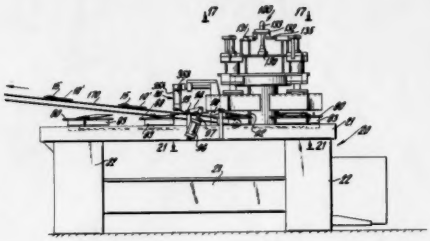
A device for the automatic framing of photographic slides comprises a slide feed way pivoted at the inlet end to be vertically reciprocated by a control cam between a "feed position" in which the outlet end faces into a slide frame holder and a "retracted position" in which the outlet end is displaced perpendicularly to the slide feeding axis. A pusher is arranged to push a slide in the feed position into a frame in the frame holder and to return in the retracted position to behind the trailing edge of another slide located in the slide feed way. Slides are cut with a cutting knife from a photographic film strip as it is moved into the slide feed way by a slide feeder and the slide feeder and slide pusher are operatively connected to one another to work substantially simultaneously.

3,788,032

## METHOD AND APPARATUS FOR FORMING ARTICLE-HOLDING DISPLAY PACKAGES

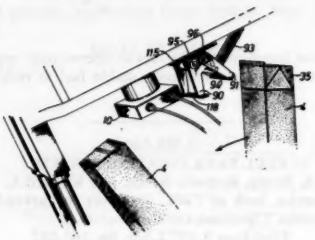
William Heffernan, Westfield; George R. Hair, Clifton, both of N.J., and John G. Nielsen, Freeport, N.Y., assignors to International Inpak Incorporated, Saddle Brook, N.J.

Filed Dec. 8, 1971, Ser. No. 205,817
Int. Cl. B65d 47/02
U.S. Cl. 53—141 17 Claims



The articles are enclosed in pockets, formed and sealed in plastic windows, of a foldable paperboard blank which has window openings on opposite sides of a fold line, the blank being covered on one surface by a heat-deformable and heat-sealable plastic sheet, at least over that area having the openings or windows formed therein. A blank support, a molding station and a blank discharge station are arranged along a linear blank travel path at substantially equal spacings from each other. A carrier is oscillatable in a vertical plane including the center line of the travel path, and carries air-released vacuum pick-up means at longitudinal spacings substantially equal to the spacings between the support and the stations. The carrier is oscillated between a first position and a second position. In the first position, a first vacuum pick-up means grips a blank, which has already been heated and has pockets formed therein, at the molding station. As the carrier is moved toward its second position, the blanks are lifted and the first pick-up means heats its supported blank. At the second position, the first pick-up means, which includes male die means, positions its blank over a female die means at the molding station, and the second pick-up means releases its formed blank at the discharge station. The already heated blank at the molding station is vacuum deformed into the female die to form the pockets, is released and the cycle is repeated. A dwell station preferably is positioned between the support and the molding station. An endless chain conveyor is moved past the discharge station and carries removable tables for receiving the formed blank. Articles are placed in the pockets at any point along the endless conveyor, and the blanks, during travel along the conveyor on the tables, are folded over to enclose the article and held in closed position while they are delivered to a turret which is revolved in synchronism with the movement of the endless chain and carries one or more, preferably three, piston and cylinder operated heat sealing dies for sealing the two halves of the blank to each other to seal the article in a pocket. The dies are supplied with dielectric energy only after engagement with the folded blanks. The packaged articles are then released onto a conveyor belt for transport away from the apparatus. The heating means for heating the blank preferably is mounted on the carrier, or may be positioned fixedly at a heating station.

3,788,033
**PACKAGING MACHINE**
Kjell Halvard Martensson; Bjorn H:son Linde; Jan-Frederik Palsson, and Sven Torsten Jerre, all of Lund, Sweden, assignors to Tetra Pak International AB, Lund, Sweden
Division of Ser. No. 227,812, Feb. 22, 1972. This application July 18, 1972, Ser. No. 272,863
Claims priority, application Sweden, Mar. 25, 1971, 3864/71
Int. Cl. B65b *3/02, 43/26, 7/20*
U.S. Cl. 53—186 4 Claims



A packaging machine for successively erecting a package blank on a mandrel and subsequently folding and sealing the bottom members of the blank while the mandrel is moved intermittently from one station to another in which means are provided for folding in the first and second bottom flap members, prior to sealing, as the mandrel moves from one station to the next.

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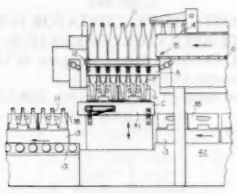
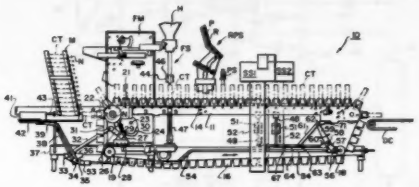
3,788,034
**GRID SET FOR AN ARTICLE LOADING MACHINE**
Thomas P. Hartness, 305 Bridgewater Dr., and Robert G. Hartness, 203 Wilmington Rd., both of Greenville, S.C.
Filed Apr. 3, 1972, Ser. No. 240,542
Int. Cl. B65b *39/02*
U.S. Cl. 53—248 11 Claims



A grid set for use on a bottle loading machine having means for positioning bottles in aligned rows above the grid set and means for positioning empty cases below the grid set. A plurality of guide members are spaced along elongated spaced members defining passages through which the bottles pass for loading into the cases. The guide members include downwardly extending rigid arms which are carried in the corner of the passages for engaging the bottles to direct them into the case. The arms have carton opening means carried on the lower end thereof for engaging the walls of cardboard cartons for aiding in opening the compartments located therein.

3,788,035
**CAULKING CARTRIDGE FILLING AND SEAMING MACHINE**
Charles E. Geisel, Crestwood, Mo., assignor to Container Corporation of America, Chicago, Ill.
Continuation of Ser. No. 83,820, Oct. 26, 1970, abandoned. This application June 21, 1972, Ser. No. 264,929
Int. Cl. B65b *3/00, 25/00*
U.S. Cl. 53—282 7 Claims



Apparatus for filling empty caulking material cartridges movable in side-by-side rows along an endless conveyor and past a filling station and stations downstream therefrom where an extruding piston is placed on the cartridge tube and a ring is seamed to the opposite end of the cartridge tube. Structure is controlled by the power means for driving the endless conveyor for operation of means for loading the cartridge tubes on to the conveyor, seaming the tubes, and discharging the filled tubes from the conveyor.

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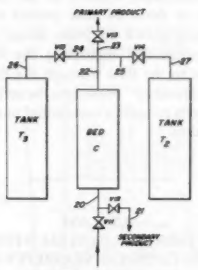
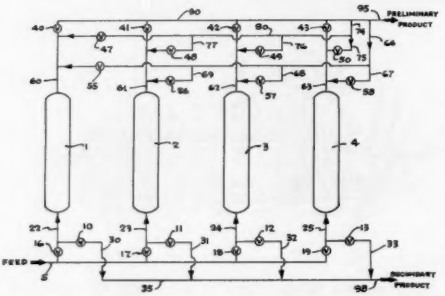
3,788,036
**PRESSURE EQUALIZATION AND PURGING SYSTEM FOR HEATLESS ADSORPTION SYSTEMS**
Hanju Lee, 5158 Evangeline Way, Columbia, Md., and David E. Stahl, 8824-B Town & Country Blvd., Elliott City, Md.
Filed July 26, 1972, Ser. No. 275,398
Int. Cl. B01d *53/04*
U.S. Cl. 55—25 16 Claims




The present invention is concerned with an improved method for fractionating multicomponent gas mixtures. More specifically, the present invention is primarily concerned with the improved process wherein a multicomponent oxygen containing feed stream is fractionated into a stream relatively enriched in the oxygen component of the mixture. The present invention particularly concerns heatless fractionation systems for separating air into an oxygen enriched primary product stream and a nitrogen enriched secondary product stream.

3,788,037
SEPARATION PROCESS
Don C. Shell, 4709 Chad Dr.; David A. Tanner, Rt. 4, Columbia Dr., and Ronald D. Brazzel, 308 Vicksburg, all of Tyler, Tex.
Filed June 28, 1971, Ser. No. 157,234
Int. Cl. B01d *53/04*
U.S. Cl. 55—58 10 Claims



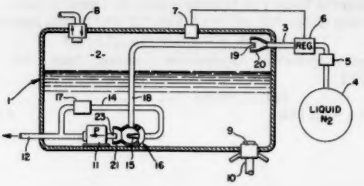

A continuous process for separating a gaseous mixture into a primary gaseous product stream and a secondary gaseous product stream utilizing four adsorbent-containing beds is disclosed.

3,788,038
PROCESS FOR SEPARATING URANIUM ISOTOPES
John C. Zahner, Princeton, N.J., assignor to Mobil Oil Corporation
Filed Jan. 12, 1972, Ser. No. 217,245
Int. Cl. B01d *57/00*
U.S. Cl. 55—17 5 Claims

Uranium isotopes can be separated utilizing shock separation techniques by introducing gaseous uranium hexafluoride at supersonic velocity into a circular or elongated duct such that parallel flow streamlines are present; placing within the supersonic parallel flow stream a plurality of hollow probes at different distances along the axis of flow said hollow probes having critical dimensions relative to the mean free path of said flow stream in front of said probes so as to cause a detached stationary shock to form ahead of each of said probes leading edges and regulating the flow through the probes in relation to the flow through the duct to arrive at a process having enhanced economic benefit. In a preferred embodiment there is present a substantial number of probes in a given axial position.

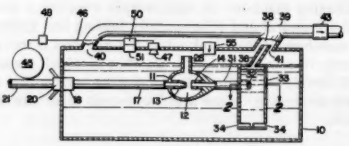
3,788,039
FUEL TANK INERTING SYSTEM WITH MEANS TO IMPROVE THERMAL STABILITY OF FUEL
Kenneth R. Bragg, Redondo Beach, Calif., assignor to Parker-Hannifin Corporation, Cleveland, Ohio
No Drawing. Filed Aug. 24, 1972, Ser. No. 283,332
Int. Cl. B01d *19/00*
U.S. Cl. 55—160 10 Claims

A fuel tank inerting system characterized in the provision of mixing means such as an aspirator or ejector to promote the diffusion equilibrium between the fuel and the nitrogen-rich ullage gas in the fuel tank to decrease the amount of oxygen dissolved in the fuel to just a few parts per million (ppm) thereby to improve the thermal stability of the fuel such that the temperature at which the fuel enters the engine can be increased without causing excessive coking, slugging and varnishing. Such improved thermal stability of the fuel allows



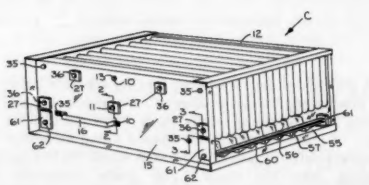

greater heat injection into the fuel or alternatively enables the use of a normally less thermally stable fuel at reduced fuel cost.

3,788,040
FUEL TANK INERTING SYSTEM
Kenneth R. Bragg, Redondo Beach, and Richard L. Kenyon, Los Angeles, both of Calif., assignors to Parker-Hannifin Corporation, Cleveland, Ohio
Filed June 9, 1972, Ser. No. 261,432
Int. Cl. B01d *19/00*
U.S. Cl. 55—160 25 Claims



A method of maintaining the ullage of a previously inerted aircraft fuel tank in the inert condition under which combustion cannot take place within the tank during the after filling of the tank with liquid fuel, and during flight of the aircraft. The method utilizes the oxygen lean ullage gases for scrubbing oxygen from incoming fuel during filling of the tank, separating the gases having scrubbed oxygen therein from the incoming fuel and venting the same to the exterior of the tank so as not to raise the oxygen content of the gases remaining in the ullage.

3,788,041
ELECTROSTATIC PRECIPITATOR FOR HIGH TEMPERATURE OPERATION
Asa K. Gaylord, Portland, Oreg., assignor to Gaylord Industries, Lake Oswego, Oreg.
Filed Sept. 13, 1972, Ser. No. 288,651
Int. Cl. B03c *3/47*
U.S. Cl. 55—129 7 Claims



The precipitator has a series of flat vertical plates which are elongated in a horizontal direction. To prevent buckling of the

plates from horizontal expansion when heated, the plates are fixedly mounted in their central portions and allowed to float on end supports so that the ends of the plates may expand freely in opposite directions away from their centers. The end supports comprise rods equipped with necked spacers which maintain uniform spacing of the plates while permitting horizontal movements on the rods during heating and cooling.

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**3,788,042**

## GAS-LIQUID CONTACTING APPARATUS

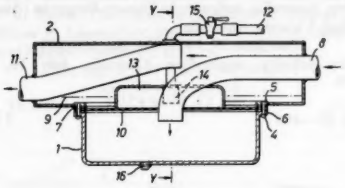
**Yat Chuen Yuen, and Kin Sun Yuen, both of 17th Floor, Flat L, Phoenix Apartment 70, Lee Garden Rd., Hong Kong**

**Filed Mar. 16, 1972, Ser. No. 235,312**

**Claims priority, application Great Britain, Mar. 24, 1971, 7,704/71**

**Int. Cl. B01h** *47/02*

**U.S. Cl. 55—227** **4 Claims**



The invention provides device for cleaning exhaust gas, particularly automobile exhaust gas, which device includes a screen immersed in a liquid and surmounted by an inverted trough having closed ends such that at least a part of the gas fed to the trough will pass more than once through the screen before reaching the gas outlet.

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**3,788,043**

## ABSORBER FOR SULFUR TRIOXIDE

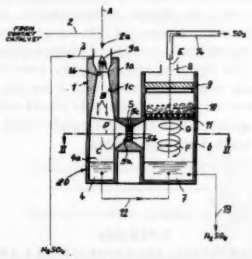
**Karl-Heinz Dorr, Mainz; Hugo Grimm, Frankfurt am Main, and Rolf Kola, Homberg, all of Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Germany**

**Filed Oct. 12, 1971, Ser. No. 188,128**

**Claims priority, application Germany, Oct. 15, 1970, P 20 50 579.7**

**Int. Cl. B01d** *47/06*

**U.S. Cl. 55—237** **3 Claims**



In a contact process for transforming sulfur dioxide to sulfur trioxide, between the contact stages there is provided an interstage absorber for removing sulfur trioxide for the gases emerging from a previous stage. The gases are passed by a venturi system in intimate contact with sulfuric acid into a settling chamber in which sulfuric acid is collected in the sump and then, by another gas/liquid contactor or reagitator, into a further settling chamber with an outlet at its upper end.

**3,788,044**

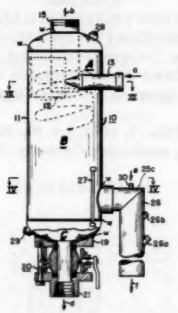
## VORTEX FLASH SEPARATOR

**John A. McNeil, 161 Franklin Ave., Brookville, Pa.**

**Filed Feb. 23, 1972, Ser. No. 228,502**

**Int. Cl. B01d** *53/24*

**U.S. Cl. 55—204** **10 Claims**



An improved apparatus has been devised for separating pure steam or dry vapor from a hot effluent being introduced under positive pressure and for enabling utilization of B.T.U.'s in an effluent fluid such as being supplied by a boiler or pressure vessel or a blow-down discharge. The flash or steam is removed by employing a centrally disposed vortex separating action in an upper sector or portion of and by moving the effluent in a cyclonic path through an intermediate sector of a chambered apparatus, with condensate and liquid as well as sludge being separated therefrom and collected in a lower sector thereof. A liquid level is maintained in the lower section and liquid being removed is cooled without adversely affecting the separating action, before its discharge from the apparatus.

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**3,788,045**

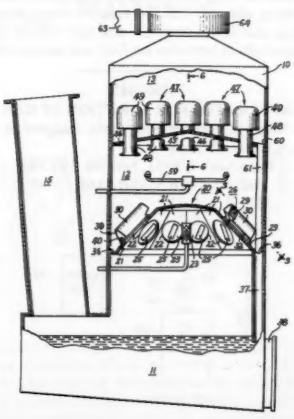
## GAS CLEANING APPARATUS

**Orlan M. Arnold, Grosse Pointe Park, Mich., and Carlo A. Vancini, Stamford, Conn., assignors to Peabody Engineering Corporation, New York, N.Y.**

**Filed Sept. 13, 1971, Ser. No. 179,910**

**Int. Cl. B01d** *47/06*

**U.S. Cl. 55—238** **12 Claims**



Gas cleaning apparatus having at least two stages. In the first stage the gas is passed through a liquid spray for removing

particulate material. In the second stage any remaining particulate matter or droplets are removed. The stages involve combinations of slotted baffles with deflectors for stripping the gas and bonnet units with concentric passages for reversal of flow for removing particulate matter by centrifugal action and by impingement.

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3,788,046

## APPARATUS FOR FILTERING GASES HAVING A MOVABLE FILTER BAG UNIT

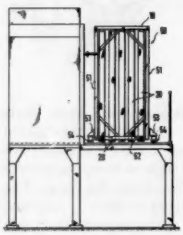
**Gerhard Kaeppler, Cologne-Heimersdorf; Stefan Ficker, Urberach, and Wilfried Werner Pergande, Cologne-Brueck, all of Germany, assignors to The Siick Corporation, New York, N.Y.**

**Filed Dec. 2, 1971, Ser. No. 203,968**

**Claims priority, application Germany, Dec. 17, 1970, P 20 62 152.7**

**Int. Cl. B01d** *46/02*

**U.S. Cl. 55—341** **1 Claim**



Filter apparatus for the separation of gas from suspended solid particles by filter bags including a housing with a filter chamber therein. The filter chamber includes a first chamber into which particle laden gas is introduced and a second chamber from which cleaned gas is withdrawn after suspended solid particles have been removed by the filter bags. Advantageously a filter bag unit is constructed so that it is movable in and out of the filter chamber for convenient inspection, cleaning and repair. The movable unit includes a gas impermeable filter bag support sheet forming a dividing wall between the first and second chambers. The support sheet has a plurality of passages with filter bags mounted thereon adjacent to passages and extending into the first chamber. A frame supports the sheets with the free ends of the filter bags extending downwardly therefrom. A releasably sealing device on the housing aligned with the support sheet securely holds the filter bag unit in the chamber and provides an airtight seal for the support sheet between the first and second chambers.

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3,788,047

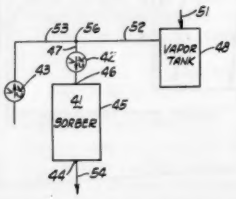
## APPARATUS FOR SORPTION OF GAS

**Merton H. Douthitt, Shaker Hts., Ohio, assignor to SCM Corporation, Cleveland, Ohio**

**Filed Nov. 4, 1971, Ser. No. 195,703**

**Int. Cl. B01d** *53/02*; **F16k** *21/04*

**U.S. Cl. 55—387** **4 Claims**




An improved apparatus containing activated carbon for the sorption of impurities from vapor-laden feed gas and a unitary fitting adapted for such apparatus are set forth. The improvement in the carbon sorber apparatus comprises a pair of check valves, the first disposed for permitting undirectional flow of laden feed gas from a supply line under superambient pressure into the inlet of a carbon sorber unit, and therein into contact with the bed of activated carbon sorbent, then out of said unit to ambient atmosphere as stripped exit gas, the second check valve disposed for supplying, in bypass of the carbon sorber unit and the first check valve, undirectional flow of ambient atmosphere into said supply line as subambient pressure occurs therein. The unitary fitting houses both said check valves disposed in proper interacting relationship for convenient, accurate, and compact installation of the apparatus.

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3,788,048

## TRASH SEPARATOR FOR SUGAR CANE HARVESTERS

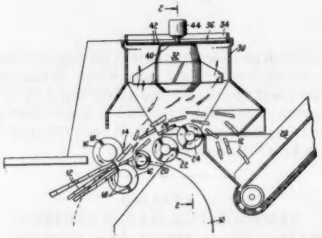
**Rodney Allan Stiff, and Keith Leonard Ruback, both of Bundaberg, Australia, assignors to Massey-Ferguson (Australia) Limited, Victoria, Australia**

**Filed June 30, 1971, Ser. No. 158,239**

**Claims priority, application Australia, July 16, 1970, 1877/70**

**Int. Cl. B01d** *45/14*

**U.S. Cl. 55—406** **3 Claims**



A trash separation apparatus for a sugar cane harvester including an extractor fan for drawing light-weight material from an airborne stream of chopped cane, an outlet for air from the extractor fan, and a rotatable element to remove light-weight material from the air passing through the outlet. The extractor fan is mounted in a housing so as to draw air up through an airborne stream of chopped cane being conveyed through the housing by flipper rollers and to force the air through an outlet in the housing. Light-weight crop material is removed from the airborne stream of chopped cane by the air drawn through the airborne stream by the extractor fan. The light-weight crop material is removed from the air passing through the extractor fan by a rotatable wheel with a plurality of spokes. The spokes catch the light weight trash and throw it outwardly into trash discharge chutes.

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3,788,049

## WHEEL MOUNTING ASSEMBLY FOR LAWN AND GARDEN TYPE TOOLS AND THE LIKE

**Stephen Jeffrey Ehrlich, Randallstown, Md., assignor to The Black and Decker Manufacturing Company, Towson, Md.**

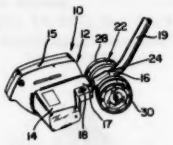
**Filed Jan. 2, 1973, Ser. No. 320,487**

**Int. Cl. A01d** *55/18*

**U.S. Cl. 56—16.9** **10 Claims**

A trimmer edger including a motor and cutter head suspended from an elongated upstanding control handle. A one-piece bracket is releasably clamped to the handle and

secures an axle on which a pair of ground engaging wheels are journaled. The bracket is constructed to securely clamp the




handle to the wheel axle and locates the wheels and handle with respect to each other and to the motor and cutter head for optimum balance and control.

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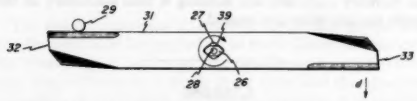
**3,788,050**

## IMPACT ABSORBER FOR ROTARY MOWER BLADE

**Douglas R. Houst, Pattersonville; Kenneth R. Jones, Elnora, and Bruce R. Laumeister, Rexford, all of N.Y., assignors to General Electric Company, Erie, Pa.**

**Filed Apr. 9, 1973, Ser. No. 348,881**
**Int. Cl. A01d** *55/18*
**U.S. Cl. 56—295** **14 Claims**




A resilient spacer element is inserted between the drive shaft mounting bolt and the central aperture of a horizontal cutting blade such that when one end of the rotating blade contacts a relatively immovable object the shear stress will cause the axis of the blade to shift relative to the axis of the shaft rather than break or bend the shaft and mounting bolt. The aperture and spacer are shaped such that a cavity exists therebetween on each side transverse to the blade, with the cavity decreasing in longitudinal cross section with increasing lateral distance from the blade center. As the spacer is displaced into the cavity, the degrees of elasticity is initially high and decreases with increased displacement.

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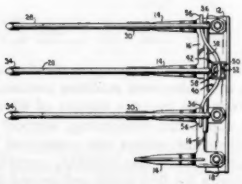
**3,788,051**

## DEVICE FOR ATTACHING TINE EXTENSIONS TO CUTTER BAR

**Raymond W. Richardson, Cawker City, Kans., assignor to Richardson Manufacturing Company, Inc., Cawker City, Kans.**

**Filed Jan. 17, 1973, Ser. No. 324,348**
**Int. Cl. A01d** *65/02*
**U.S. Cl. 56—318** **10 Claims**



A releasable fastening device of universal character which is employed to detachably secure sickle guard extensions to the cutter bar assembly of a combine. An elongated, resilient clip of heavy steel wire extends across a series of three of the extensions with its opposed end portions engaging the two outer extensions of the series. A catch is secured to the sickle guard support bar by the center sickle guard bolt, and the clip is flexed rearwardly into engagement with the catch. The central portion of the clip seats within notches provided in the catch to hold the clip in the flexed condition.

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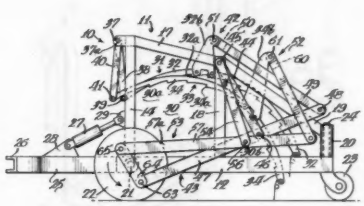
**3,788,052**

## GROUND ENGAGING HAY BALE ROLLING APPARATUS

**Keith D. Elwick, Vinton, Iowa, assignor to Starling, Inc., Harvard, Ill.**

**Filed Nov. 9, 1972, Ser. No. 305,152**
**Int. Cl. A01d** *39/00*
**U.S. Cl. 56—341** **13 Claims**



A hay bale rolling apparatus adapted to be moved along a windrow of hay to roll the windrow into a series of separate bales in contact with the ground. A bale rolling chamber is open at the bottom, and parallel, curved baling bars are suspended in the chamber, extending from the rear lower portion to the front upper portion. The bars are arranged alternately in two sets which are longitudinally oscillated in vertical planes in opposite phase so as to alternately contact the hay and push it forward with a rolling action as the apparatus moves along a windrow.

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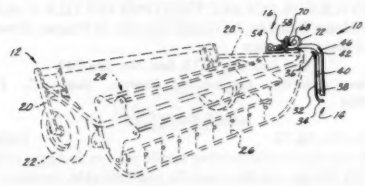
**3,788,053**

## WINDROW CONTROLLER

**Charles O. Bonnett, RR 1, Howard, Kans.**

**Filed May 30, 1972, Ser. No. 257,827**
**Int. Cl. A01d** *77/06*
**U.S. Cl. 56—399** **10 Claims**



An upright shield is attached at the discharge end of a crop conditioning apparatus which is used in a field of previously cut crops to rake the crop transverse to the line of motion and discharge it to one end thereof. The shield is mounted transverse the crop conditioning apparatus. In operation it receives discharged material and limits the outward movement of the material relative the crop conditioning apparatus.

3,788,054

## APPARATUS FOR TRANSPORTING AND STORING YARN PIRNS OR THE LIKE

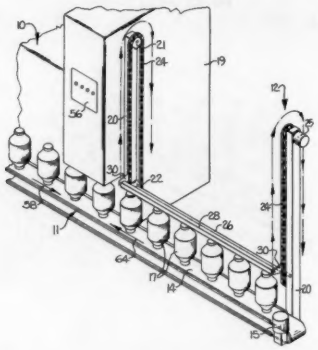
Gerhard Haussmann, and Gunter Schulz, both of Ebersbach-Sulpach, Germany, assignors to Zinser-Tertilmaschinen Gesellschaft mit beschrankter Haftung, Ebersbach, Germany

Filed Aug. 2, 1972, Ser. No. 277,480

Claims priority, application Germany, Aug. 4, 1971, P 21 38 926.4

Int. Cl. D01h *13/26*

U.S. Cl. 57—34 R 20 Claims



An apparatus for transporting and storing a plurality of yarn packages and/or pirns in a separated, non-contacting arrangement and including a portable storage unit which comprises a number of horizontally directed supports, each support being adapted to hold the lower end of a plurality of yarn packages. The supports are movable along an endless path of travel such that the supports may be individually brought to a transfer station. The apparatus further includes a conveyor extending along one side of a yarn processing machine and which is adapted to convey the doffed yarn packages in a separated arrangement to a loading station. A transfer apparatus is also provided which is cyclically operable to transfer a plurality of separated yarn packages between the transfer station on the storage unit and the loading station, the transfer apparatus serving to advance the storage unit during each cycle of operation to thereby bring a different support to the transfer station after each cycle of operation.

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3,788,055

## DEVICE FOR DOUBLE TWISTING TEXTILE YARN

Carlos Matas Gabalda, Le Grand duc-rue de Prague, Granges-Les-Valences, France

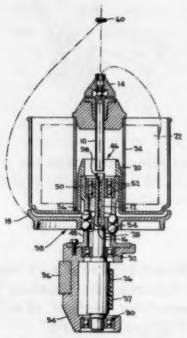
Filed Jan. 26, 1973, Ser. No. 326,744

Claims priority, application France, Jan. 27, 1972, 71.02804

Int. Cl. D01h *7/86*

U.S. Cl. 57—58.72 9 Claims

A device for double twisting textile yarn including a rotating assembly having a hollow spindle rod rotatable coaxially with a plate having a plurality of substantially cylindrical holes therethrough equally spaced around the axis of rotation and at least a pair of balls disposed in each of the holes in the plate, and a stationary winding support assembly including a pair of support members disposed on opposite sides of spaced plate and having edges forming eliptical ramps disposed in spacd parallel relation inclined relative to the plane of rotation of the plate, the plate extending within the space between the ramps such that the balls contact the ramps to prevent movement of the upper support member, the lower support member being fixed to a stationary frame. Yarn is supplied from a winding surrounding a spindle member coaxial with the spindle rod,



the winding being mounted on a carrier fixed to the upper support member such that the winding is held stationary as the spindle rod and plate are rotated.

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3,788,056

## APPARATUS FOR SELECTIVELY CHANGING THE SENSE OF ROTATION OF THE TWIST TUBE OF A FALSE-TWIST MACHINE

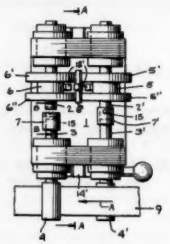
Hans Burri, Adelaide, Australia, assignor to Heberlein & Co. AG, Wattwil, Switzerland

Filed Mar. 2, 1972, Ser. No. 231,294

Claims priority, application Switzerland, Mar. 24, 1971, 4325/71

Int. Cl. D02g *1/06*; D01h *1/24*

U.S. Cl. 57—77.45 6 Claims



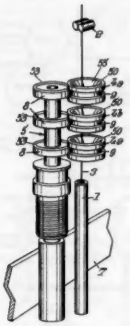
Apparatus for selectively changing the direction of rotation of twist tubes in a false-twist machine containing two axially parallel rollers in the cuneate throats of which at least one twist tube is supported comprising, support means, shafts rotatably carrying the rollers and supported in the support means, two further shafts also rotatably carried by the support means coaxial with the first shafts and spaced therefrom, driving rollers carried by the further shafts and adapted to be driven by a belt, and coupling means carried by the further shafts at the other ends thereof and which are adapted for selective coupling with opposite ends of the roller carrying shafts.

3,788,057

## TWISTING DEVICES FOR FILAMENTS

Guy Batsch, Aubenas, France, assignor to Societe Civile Textile dite Socitex, Lyon, France

Filed Dec. 14, 1972, Ser. No. 315,166
Claims priority, application France, Jan. 5, 1972, 72.00168
Int. Cl. D02g *1/02*
U.S. Cl. 57—77.4 8 Claims



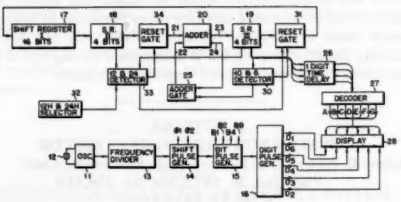
The device comprises at least one rotary ring against which the filament must be applied so as to be driven in rotation by the inner edge of the rotary ring to undergo twisting. This rotary ring is driven by a single drive roller and the rotary ring comprises an outer edge of magnetic material. It is supported on said single drive roller by a fixed support roller and by a magnetic device inserted between the fixed support roller and the single drive roller.

3,788,058

## ELECTRONIC DIGITAL CLOCK APPARATUS

Gijun Idei; Atsushi Onoyama, both of Yokohama; Mitsuo Aihara, Tokyo; Seigo Suzuki, Yokohama; Hideharu Egawa, Tokyo, and Eiichi Yamaga, Hatogaya, all of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki-shi, Japan

Filed June 19, 1972, Ser. No. 264,185
Claims priority, application Japan, June 23, 1971, 46-44779
Int. Cl. G04c *3/00*; G04b *19/30*
U.S. Cl. 58—23 R 15 Claims



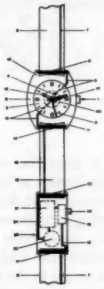

A plurality of shift registers for storing time information represented by numbers consisting of a plurality of digits are connected to an adder to form a closed loop. The time information stored in the shift registers is circulated through the closed loop in a minimum unit length of time. When the adder is supplied with information on the minimum unit length of time, it receives a single addition pulse per minimum unit length of time. A decoder is supplied with four bit outputs from a shift register corresponding to a particular digit position, and outputs from the decoder are supplied to a plurality of digit indicators in common. The digit indicators are successively impressed with operating voltage to display time information periodically.

3,788,059

## ALARM WRIST WATCH

Paolo Spadini, 78, Ave. Leopold-Robert, La Chaux-de-fonds, Switzerland

Filed Oct. 16, 1972, Ser. No. 297,909
Int. Cl. G04c *3/00*; G04b *23/12*; G04c *21/34*
U.S. Cl. 58—23 BA 3 Claims



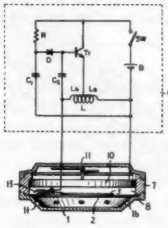
An alarm wrist watch incorporating a watch band, a watch casing and an electro-acoustical signal transmitter which can be activated by the watch movement or clockwork at preselected signalling times. The electro-acoustical signal transmitter is arranged at a part of the watch band removed from the watch case.

3,788,060

## WATCH WITH AN ELECTRONIC BUZZER

Yasukazu Kawamura, 3-12-9-102 Narashinodai, Funabashi, Japan

Filed Nov. 22, 1972, Ser. No. 308,763
Claims priority, application Japan, Dec. 9, 1971, 46-116112[U]; Dec. 17, 1971, 46-101887[U]
Int. Cl. G04c *21/34*; G04b *23/12*
U.S. Cl. 58—38 3 Claims



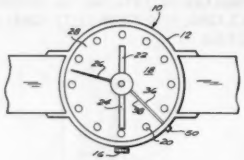
A watch with an electronic buzzer which comprises a double-constructed back cover including an inner back cover on which a piezoelectric element is mounted to produce a mechanical buzz sound when a voltage is applied thereto and an outer back cover provided with a plurality of small holes for enhancing transmission of the buzz. A driving circuit for actuating or energizing the piezoelectric element is disposed in the watch case releasably from the back cover and the piezoelectric element. This construction enables the watch to be made small in size and assures the watertightness of the watch.

3,788,061

## ILLUMINATED DIAL WATCH

Nils M. Tornquist, Morgantown, Pa.; Howard Kneeland, Forestville, and William K. Sessions, Jr., Bristol, both of Conn., assignors to New England Clock Company, Farmington, Conn.

Filed Dec. 7, 1972, Ser. No. 312,805
Int. Cl. G04b 19/30, 37/08
U.S. Cl. 58—50 R 4 Claims



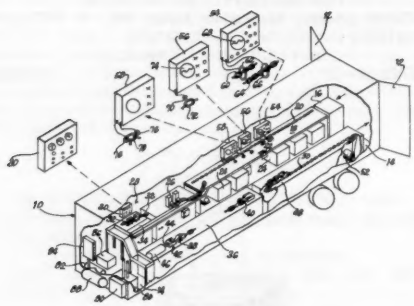
An improved watch is provided which includes a lamp mounted in the geometric center of the watch crystal. Light impervious reflecting means overlie the lamp and a minor portion of the crystal reflecting light from the lamp to the watch dial. A pair of electrically conductive leads extend from the lamp to a battery mounted in the watch case and a switch is provided for controlling current to the lamp. The crystal, lamp and leads are integrally formed into a single unit with the leads terminating in a pair of tabs adapted to meet in electrically conducting relationship with the terminals of the battery.

3,788,062

## CHAIN INSPECTION AND REPAIR SYSTEM

Richard L. Booth, Munster, Ind., assignor to S. G. Taylor Chain Company, Inc., Hammond, Ind.

Filed Sept. 21, 1972, Ser. No. 290,872
Int. Cl. B21l 21/00
U.S. Cl. 59—35 16 Claims



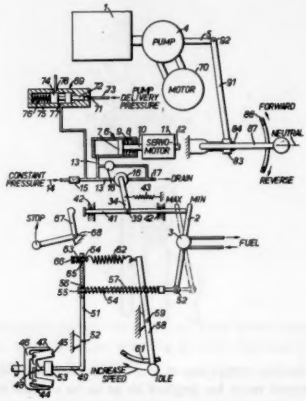
A system for inspecting and repairing lengths of chain wherein various structures are located on a portable bed such as a trailer whereby the inspection and repair means can be transported from one location to another for handling of the chain at the site of the user. The equipment on the portable bed comprises an inspection table and means for removing non-standard links. A splice welding apparatus is provided for replacing individual links, and a unique heat-treating means are provided for assuring that the proper strength level is attained for new links. Additional equipment is provided for strength-testing the lengths by pulling means and also providing non-destructive testing equipment.

3,788,063

## HYDRAULIC APPARATUS

Bertram Carl Kempson, Merioneth, and James Andrew Nicholls, Cheltenham, both of England, assignors to Dowty Hydraulic Units Limited, Cheltenham, England

Filed July 3, 1972, Ser. No. 268,906
Int. Cl. F02b 41/00
U.S. Cl. 60—19 18 Claims




This invention relates to a control system for an engine arranged to drive a load through a smoothly variable speed ratio transmission. A speed responsive member movable in accordance with engine speed operates jointly to adjust fuel flow to the engine and to control the speed ratio of the transmission. For a predetermined range of engine speeds over which the speed responsive member adjusts fuel flow to the engine to tend to maintain speed within the range the transmission is maintained at a fixed speed ratio. When the engine speed drops below a predetermined speed the speed responsive member operates to reduce speed ratio in accordance with reduction of engine speed below the predetermined speed. The predetermined range of speeds, the predetermined speed and the fixed speed ratio may each be separately adjustable.

The invention may be applied to the propulsion of a vehicle such as a crawler tractor having spaced ground engaging elements individually driven by two variable speed ratio transmissions from a single engine. The speed ratios may be separately adjustable and the speed responsive member on the engine may operate jointly on the speed ratios when the speed falls below the predetermined speed to reduce the speed ratios, maintaining the selected steering proportionality between the speed ratios as they are reduced. In this way any selected steering path for the vehicle is maintained during speed ratio reduction by the engine speed responsive member.

3,788,064

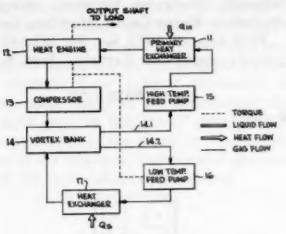
## SYSTEM FOR DRIVING HEAT MOTOR

Robert D. Hawkins, 2126 Raven Rd., Pleasanton, Calif.

Filed Jan. 26, 1972, Ser. No. 220,818
Int. Cl. F01k 25/00
U.S. Cl. 60—36 19 Claims

A heat engine having a shaft output is connected to a vortex separating means, such as a bank of Ranque tubes, for deriving first and second gas flows respectively having higher and lower temperatures than input gas to the vortex separating means. The heat engine and a high temperature heat exchanger are in a first feedback loop responsive to the first gas flow. A second feedback loop, responsive to the second flow from the bank of vortex tubes, includes a low temperature heat exchanger responsive to scavenged or rejected heat of the system. The first feedback loop may include a second

bank of vortex tubes which feeds hot and cold gases to a heat exchanger and vapor generator, respectively. The gases fed to the heat exchanger and vapor generator, after passing through




them, are condensed. The condensed gas is fed to the vapor generator and heat exchanger to the heat engine. The heat engine may be, e.g., a simple gas turbine or a compound turbine.

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**3,788,065**

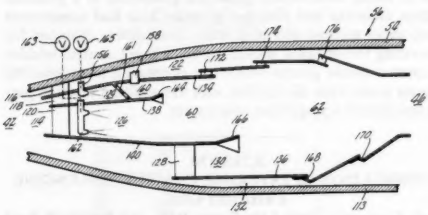
**ANNULAR COMBUSTION CHAMBER FOR DISSIMILAR FLUIDS IN SWIRLING FLOW RELATIONSHIP**

**Stanley J. Markowski, East Hartford, Conn., assignor to United Aircraft Corporation, East Hartford, Conn.**

**Filed Oct. 26, 1970, Ser. No. 84,086**

**Int. Cl. F02c** *3/00*

**U.S. Cl. 60—39.02** **74 Claims**



The characteristics of thermodynamically and aerodynamically dissimilar fluids in swirling flow relationship are established and/or varied to accelerate mixing and hence combustion in the combustion zone and mixing and hence cooling of the products of combustion, in the dilution zone of an annular burner.

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**3,788,066**

**REFRIGERATED INTAKE BRAYTON CYCLE SYSTEM**

**William H. Nebgen, Woodside, N.Y., assignor to Brayton Cycle Improvement Associates, New York, N.Y.**

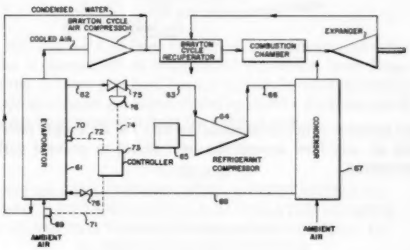
**Continuation-in-part of Ser. No. 34,717, May 5, 1970, Pat. No. 3,668,884. This application Sept. 14, 1971, Ser. No. 180,282**

**Int. Cl. F02g** *3/00*

**U.S. Cl. 60—39.05** **10 Claims**

In an open Brayton cycle, suction air is cooled by refrigeration to a predetermined temperature preferably to at least 50°F. below ambient air temperature. In the case of a conventional refrigeration system with refrigerant evaporation and condensation utilizes ambient air for condensation, the refrigeration is controlled to maintain a fixed temperature differential between the temperature at which the refrigerant evaporates and at which it condenses. If the temperature of the suction air is below the freezing point of water an aqueous solution of a water vapor pressure depressant such as glycol may be used under conditions which avoid, or control, freezing. This aqueous solution may be sprayed on cooling coils in indirect heat transfer or it may be cooled by circulation in indirect heat transfer and then used in direct contact to cool and condense water vapor from the suction air. The condensed water is vaporized, preferably with waste heat and injected into the compressed air stream.

The refrigeration system may be a conventional one driven by the shaft or from the power network or it may be one which is driven by a system utilizing waste heat of the Brayton cycle exhaust gases. In a conventional system, multistage refrigeration is preferred.




In the use of a solution of glycol the composition is maintained by distillation of water under pressure with utilization of the steam in the air stream between the Brayton cycle compressor and expander to improve output and thermal efficiency.

The advantages of suction air refrigeration are especially marked when in combination with regeneration in the Brayton cycle and the advantages of regeneration are greater when in combination with suction air refrigeration.

Still greater advantages result from a combination of suction air refrigeraton with both regeneration and gasification of fuels which contain sulfur and particulates.

A portion of the refrigeration capacity for suction air cooling may be used for the cooling of electric generators and transformers.

Suction refrigeration results in similar advantages when used with a closed Brayton cycle, wherein the working fluid is a dry gas, such as helium, or argon, or the like.

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**3,788,067**

**FUEL BURNERS**

**Denis Richard Carlisle, Risley, and John Joseph Nichols, Longbridge, both of England, assignors to The Secretary of State for Defense, in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, Whitehall, London, England**

**Filed Jan. 31, 1972, Ser. No. 221,954**

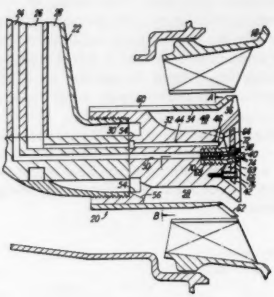
**Claims priority, application Great Britain, Feb. 2, 1971, 3657/71**

**Int. Cl. F02c** *7/22*; **F02g** *3/00*

**U.S. Cl. 60—39.74 B** **3 Claims**

A dual fuel burner assembly for a gas turbine engine has a fuel nozzle consisting of a central member in which ducts for the flow of liquid and gaseous fuel and a supply of air are formed and a shroud member. The outlets of the liquid fuel ducts communicate with the air supply ducts and the shroud member has a flared end formed with a number of equi-spaced slots which are aligned with the outlets of the gaseous fuel ducts. A supply of air is arranged to flow through the slots to stabilise the flow of gaseous fuel at low fuel flows.

A heat shield is attached to the downstream face of the central member and the gap between the heat shield and the central member is in communication with the air supply ducts so that air can flow around the heat shield to prevent carbon deposition.



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**3,788,068**

**STEAM POWER PLANT, ESPECIALLY WITH A BOILING WATER NUCLEAR REACTOR**

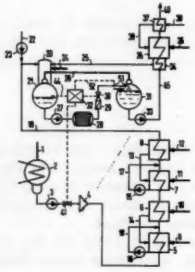
**Hans-Gunter Heitmann, Buckenhof, and Fritz Kelp, Erlangen, both of Germany, assignors to Kraftwerk Union AG, Mulheim, Ruhr, Germany**

**Filed Mar. 17, 1971, Ser. No. 125,147**

**Claims priority, application Germany, Mar. 21, 1970, 2013679**

**Int. Cl. F22d** *3/00, 11/00;* **B01d** *35/02*

**U.S. Cl. 60—106** **7 Claims**



Steam power plant includes a feedwater flow path, feedwater receptacle means located in the flow path, and feedwater degassing means also located in the flow path in the vicinity of the feedwater receptacle means, the feedwater receptacle means being divided into two separate vessels connected in series in the feedwater flow path, and a precipitating device having a magnetic filter connected in the feedwater flow path between the separate vessels of the feedwater receptacle means.

**3,788,069**

**LIQUID FUELED ROCKET ENGINE OF THE MAIN CURRENT TYPE HAVING SEPARATE CONTROL NOZZLES OPERATED FROM TURBINE EXHAUST GASES BRANCHED OFF FROM THE ROCKET PROCESS**

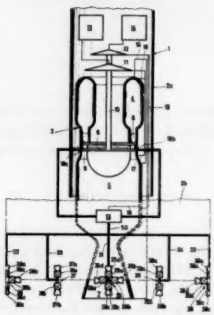
**Gunther Schmidt, Ottobrunn, Germany, assignor to Messerschmitt-Bolkow-Blohm GmbH, Munchen, Germany**

**Filed Aug. 18, 1972, Ser. No. 281,647**

**Claims priority, application Germany, Sept. 8, 1971, P 21 44 819.1**

**Int. Cl. F02k** *9/02*

**U.S. Cl. 60—207** **9 Claims**



A liquid fueled rocket engine of the so-called main current type in which combustion gases are generated in a precombustion chamber and directed in series to a fuel component pump drive turbine and to a main combustion chamber for generating thrust gases, includes one or more control nozzles or control nozzle groups which are connected to receive the exhaust gases from the turbine with the addition of small partial amounts of a propellant component.

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**3,788,070**

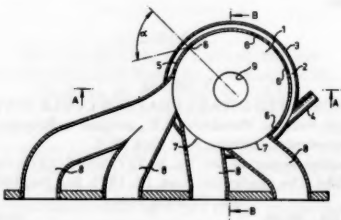
**PURIFICATION OF INTERNAL COMBUSTION ENGINE EXHAUST GAS**

**Mario Camarasa, Ostia Lido Rome, Italy, and Bernhard Josef Kraus, Linden, N.J., assignors to Esso Research Engineering Company, Linden, N.J.**

**Filed June 12, 1972, Ser. No. 262,132**

**Int. Cl. F02b** *75/10;* **F01n** *3/10*

**U.S. Cl. 60—290** **13 Claims**



Thermal reactor for mitigating or eliminating pollutants in automotive exhaust gas comprising an inner reaction

chamber, an outer sleeve enclosing the reaction chamber, means for supplying cool air to the annular space thus formed between the reaction chamber and the sleeve, the chamber wall being formed with longitudinal slots (parallel to the chamber's axis) which are inclined relative to their respective radii from the center of the chamber so that air enters the chamber from the annulus and some circulates generally around the interior wall of the chamber thereby to protect it from high interior temperatures. Exhaust gas is passed to one end of the chamber from exhaust conduit(s) which are inclined in the same sense as the longitudinal slots and at roughly the same angle so that vortex circulation of exhaust gas and air is promoted in the chamber. The exhaust gas/air mixture reacts in the chamber, and purified gas passes out of the chamber at the centre of the opposite end.

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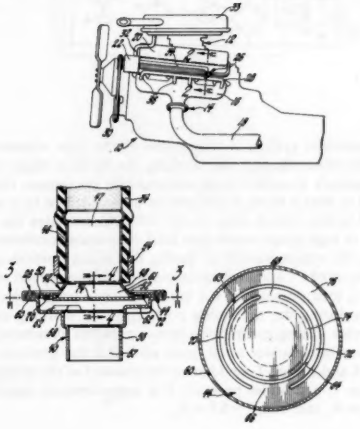
**3,788,071**

## ALL-METAL CHECK VALVE FOR AIR INJECTION SYSTEM

**Robert W. Brewer, Dayton, Ohio, assignor to General Motors Corporation, Detroit, Mich.**

**Filed June 29, 1972, Ser. No. 267,395**
**Int. Cl. F01n** *3/02*; **F16k** *21/04*
**U.S. Cl. 60—293** **1 Claim**



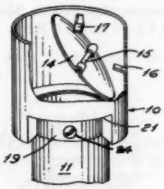
An all-metal check valve for an air injection system of an internal combustion engine includes a valve body defining a chamber between the valve inlet and the valve outlet in which a valve disc is operative to control fluid flow between an air pump and the exhaust manifolds. The valve disc has an outer ring attached to the valve body and a central valve element hingedly connected to the ring by a pair of arcuate flexible arms defined by a pair of concentric diametrically opposed C-shaped slots. The arms are normally flexed for biasing the valve element against a valve seat to block the reverse flow of exhaust gases therethrough. Injection air flow additionally flexes the arms to shift the valve element to an open position for permitting flow from the air pump to the exhaust manifolds.

**3,788,072**

## RAIN CAP FOR EXHAUST PIPE

**Edgar P. Burger, Detroit, Mich., assignor to Ford Motor Company, Dearborn, Mich.**

**Filed May 3, 1972, Ser. No. 249,897**
**Int. Cl. F01n** *7/00*; **F23l** *17/02*
**U.S. Cl. 60—324** **1 Claim**




A rain cap for a vertical exhaust of an internal combustion engine is formed of an open-ended cylindrical body larger than the exhaust pipe and having a pivotally mounted cover opened by exhaust gases and closed by gravity. Portions struck from the body support it from the exhaust pipe.

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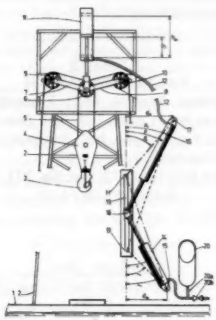
**3,788,073**

## APPARATUS FOR APPLYING A SUBSTANTIALLY CONSTANT TENSION TO AN ELONGATED MEMBER CONNECTED TO AN INSTALLATION SUBJECT TO ALTERNATING MOVEMENTS

**Andre Castela, Mesnil-Le-Roi, and Philippe Joubert, Meudon-La-Foret, both of France, assignors to Institut Francais du Petrole, des Carburants et Lubrifiants, Rueil-Malmaison, France**

**Filed Apr. 28, 1972, Ser. No. 248,727**
**Claims priority, application France, May 3, 1971, 7115911**
**Int. Cl. F15b** *13/16*
**U.S. Cl. 60—413** **1 Claim**



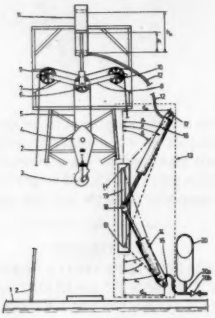
Apparatus for applying a substantially constant tension to an elongated member connected to an installation subjected to alternating movements which comprises the combination of at least one jack supporting said elongated member with regulating means located on the installation, supplying a determined working pressure with the use, as pressure source, of an accumulator delivering to a jack an auxiliary fluid under a pressure varying with the displacement of one element (piston or cylinder) of said jack, comprising at least two jacks, one of which has one element articulated to a fixed point and the other element articulated to one element of another jack through a movable articulation member compelled to be displaced along a predetermined path when one of the elements of a jack is displaced with respect to the other.

3,788,074

## DEVICE SUPPLYING A WORKING FLUID UNDER A DETERMINED PRESSURE

Andre Castela, Mesnil-le-Roi, and Philippe Joubert, Meudon-la-Foret, both of France, assignors to Institut Francais du Petrole des Carburants et Lubrifiants, Rueil-Malmaison, Hauts-de-Seine, France

Filed Apr. 28, 1972, Ser. No. 248,728
Claims priority, application France, May 5, 1971, 7115911
Int. Cl. F15b *1/02*; E21b *19/08*
U.S. Cl. 60—413 8 Claims



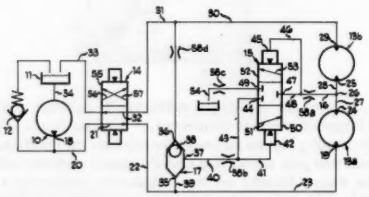
Device for supplying a working fluid under a determined pressure with the use, as pressure source, of an accumulator delivering to a jack an auxiliary fluid under a pressure varying with the displacement of one element (piston or cylinder) of said jack, comprising at least two jacks, one of which has one element articulated to a fixed point and the other element articulated to one element of another jack through a movable articulation member compelled to be displaced along a predetermined path when one of the elements of a jack is displaced with respect to the other.

3,788,075

## VALVE MECHANISM

John W. Holdeman, Muncie, Ind.; Kenneth G. McMillen, deceased, late of New Castle, Ind., and Leanne S. McMillan, administratrix, Fort Wayne, Ind., assignors to Borg-Warner Corporation, Chicago, Ill.

Filed July 13, 1972, Ser. No. 271,305
Int. Cl. F15b *11/16*
U.S. Cl. 60—424 18 Claims



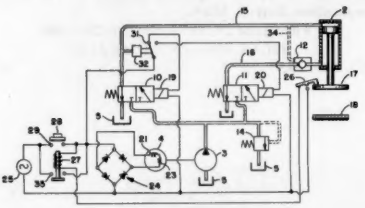
A pressure equalizer valve and reversible flow logic system are provided for reversible fluid motors that are connected in series. The pressure equalizer valve is effective to bypass a small quantity of fluid from the source of fluid pressure to the junction between the motors or from the junction between the motors to a low pressure conduit. This bypassing of fluid is effective to provide equal or proportional operating pressures across the fluid motors, to prevent cavitation of the downstream fluid motor, and to act as a fluid differential for the fluid motors when propelling a vehicle that is making a turn. The logic system provides reversible flow fluid communication between the fluid motors and the equalizer valve so that the equalizer valve functions properly when the fluid motors are reversed.

3,788,076

## HYDRAULIC SYSTEM WITH SERIES WOUND PUMP DRIVE MOTOR

Zdenek J. Lansky, Solon, and Leslie M. Claar, Richmond Heights, both of Ohio, assignors to Parker-Hannifin Corporation, Cleveland, Ohio

Filed Mar. 20, 1972, Ser. No. 236,392
Int. Cl. F15b *11/04*
U.S. Cl. 60—452 6 Claims



A hydraulic system for apparatus of the type wherein the load resistance during the working stroke of a fluid motor progressively increases from minimum to maximum, characterized in that a fixed displacement pump, driven by a series wound motor, which may be AC OR DC, actuates the fluid motor at high speed under low load resistance conditions (as during the return stroke or during the initial portion of the working stroke), and at progressively decreasing speed and increasing load pressure as the load resistance progressively increases during the remaining portion of the working stroke. The series wound pump drive motor operates at substantially full rated horsepower at all times such that the product of its speed S and torque T, and hence the product of the pump output flow Q and outlet pressure P is approximately equal to a constant K, that is, QP = ST = K.

3,788,077

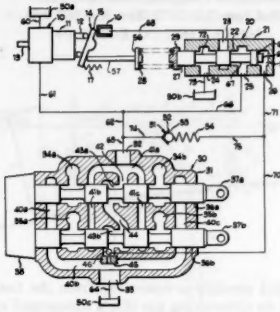
## OPEN CENTER CONTROL OF VARIABLE PUMPS

Raymond E. Johnson, Muncie; Wendell E. Miller, Warsaw, both of Ind.; Kenneth G. McMillen, deceased, late of New Castle, Ind., and Leanne S. McMillen, administratrix, Fort Wayne, Ind., assignors to Borg-Warner Corporation, Chicago, Ill.

Filed July 13, 1972, Ser. No. 271,303
Int. Cl. F16h *39/46*
U.S. Cl. 60—452 20 Claims

Control of the displacement of a variable displacement pump is achieved by the use of a standard opencenter type of

control valve and pump displacement controls that include a sensor valve. The control functions that are achieved include



system standby at low pressure and minimum displacement thereby minimizing power loss and heat rise.

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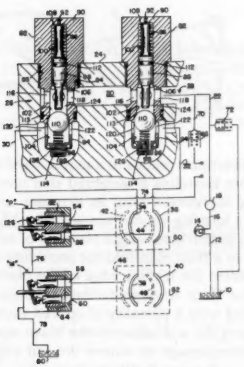
**3,788,078**
**HYDROSTATIC TRANSMISSION CHECK VALVES WITH AUTOMATIC UNLOADING**

**Raymond D. Rubenstein, La Grange Park, Ill., assignor to International Harvester Company, Chicago, Ill.**

**Filed Sept. 22, 1972, Ser. No. 291,499**
**Int. Cl. F16h *39/10***
**U.S. Cl. 60—464** **6 Claims**



Hydrostatic transmission having a crossover which is provided with check valves. The check valves are automatically controlled by a series of power chambers that respond to different hydrostatic pressures.

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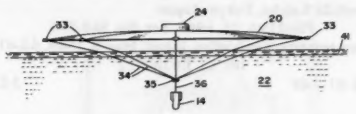
**3,788,079**
**METHOD AND APPARATUS FOR COLLECTING A FLOATING LIQUID**

**William P. Kirk, 22 Glenhaven Cir., Saco, and Dwight W. Reynolds, RFD 1, Box 49, Pownal, both of Maine**

**Filed May 26, 1972, Ser. No. 257,413**
**Int. Cl. E02b *15/04***
**U.S. Cl. 61—1 F** **13 Claims**

A floating liquid such as an oil spill is collected under a sheet with weighted periphery. The sheet is deployed by spreading it horizontally over the liquid surface, after which the periphery submerge, confining and centrally concentrating the liquid. The sheet retains the liquid for subsequent pumping into a vessel.



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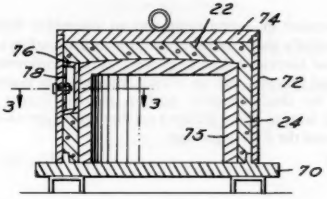
**3,788,080**
**METHOD OF CONSTRUCTING CONCRETE MANHOLES HAVING SEALED JOINTS WITH PIPES CONNECTED THERETO**

**William E. Washabaugh, 5354 Hilltop Dr., and Edward Peter Washabaugh, Jr., 1701 Mosher, both of Bay City, Mich.**

**Filed June 16, 1971, Ser. No. 153,572**
**Int. Cl. E04b *1/16***
**U.S. Cl. 61—2** **7 Claims**



A method of effecting a joint between a pipe and underground manhole walls or the like utilizes an adapter ring secured and sealed in an aperture of the manhole wall and having an internal diameter accommodating the particular diameter pipe to be sealed with a gasket surrounding the pipe and urged by a gland ring having fasteners cooperating with the adapter ring into fluid pressure sealed relation between the internal diameter of the adapter ring and a radially opposed peripheral surface of the pipe. The construction is such that a workman effecting the pipe joint may work within the safety of the manhole. The adapter rings and manholes have common matching bevelled surfaces and the adapter rings have various internal diameters such that a given manhole may be adapted to various size pipes by selecting the adapter ring having an internal diameter accommodating the particular pipe selected, thereby reducing manhole inventory.

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**3,788,081**
**GROUTING COMPOSITION**

**Arthur Sarkisian, Cranford, and Charles F. Murphy, Morristown, both of N.J., assignors to International Telephone and Telegraph Corporation, New York, N.Y.**

**Filed Aug. 30, 1972, Ser. No. 284,942**
**Int. Cl. E02d *19/16***
**U.S. Cl. 61—36 R** **10 Claims**

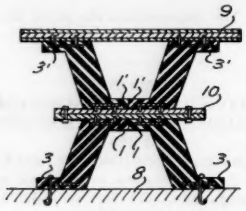
A grouting composition which, after setting, results in a grouted structure of improved dimensional and physical stability in air and of excellent stability in water comprising a mixture of (1) a gel-forming aqueous solution containing one part by weight solids content of (a) a vegetative polyphenolic material which is a tannin of the catechin or condensed type or an alkaline extract of coniferous tree barks, (b) an aldehye and (c) a water soluble catalyst and (2) from four to seven parts by weight of fly ash, or modified fly ash, having a pH of at least seven.

3,788,082

## ASSEMBLED FENDER UNIT

Jiro Narabu, Tokyo, Japan, assignor to Seibu Gomu Kagaku Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 23, 1969, Ser. No. 868,874
Claims priority, application Japan, May 8, 1969, 44-41695
Int. Cl. E02b 3/22
U.S. Cl. 61—48 3 Claims



The present invention relates to an assembled fender unit composed of a shock-receiver portion with a reinforcing piece embedded therein, a fixture portion with a reinforcing piece embedded therein, and an elastic intermediate section connecting the shock-receiver portion and the fixture portion with said section being inclined relative to the shock-receiver portion and the fixture portion.

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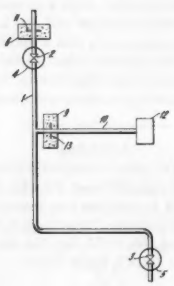
3,788,083

## METHOD OF FITTING PIPING FOR A HOT OR COLD FLUID

Jens Ove Lundgren, Orebro, Sweden, assignor to Rorkonsult For Fjarrvarmei Orebro AB, Orebro, Sweden

Filed Nov. 15, 1971, Ser. No. 198,644
Claims priority, application Sweden, Nov. 19, 1970, 15697/70; May 28, 1971, 6996/71
Int. Cl. F16l 27/00; F24d 3/00
U.S. Cl. 61—72.1 3 Claims



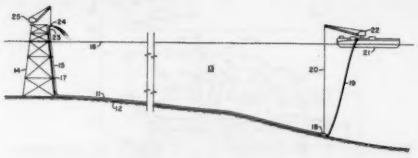
A piping for a hot or a cold fluid may be exposed to harmful stresses when the fluid in the piping changes its temperature. So-called compensators have been used for reducing said stresses. According to the invention the compensators may be omitted if the piping is heated to a temperature between its minimum and maximum operating temperature before it is fixed in the desired position.

3,788,084

## RECOVERY OF MARINE PIPELINES

Jamie F. Matthews, Jr., Houston, Tex., assignor to Esso Production Research Company, Houston, Tex.

Filed June 23, 1972, Ser. No. 265,900
Int. Cl. F16l 1/00; B08b 9/04
U.S. Cl. 61—72.3 21 Claims



A liquid-filled pipeline is recovered from the bottom of a body of water by introducing gas into a submerged end of the line behind a one-way pigging device until a section of the line at least sufficiently long to reach to the surface of the body of water has been substantially voided of liquids and thereafter lifting the end of the pipeline to the water's surface. The procedure disclosed often reduces substantially the amount of liquid that must be removed from the line to permit lifting of the pipe without danger of buckling.

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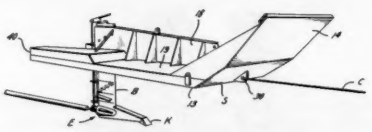
3,788,085

## METHOD AND APPARATUS FOR LAYING A PIPE LINE

Robert E. Holberg, 608 W. Bough Lane, Houston, Tex.

Filed Dec. 6, 1971, Ser. No. 205,210
Int. Cl. E02f 5/02
U.S. Cl. 61—72.4 5 Claims



The present invention relates to a method and apparatus for laying a pipe line including a weighted sled having a vertical blade extending therebelow with an extruder cone affixed to its lower end for forming a subterranean tunnel for receiving a pipe. The blade is provided with a plurality of spaced jet nozzles connected to a fluid manifold for providing high pressure jet streams adjacent the leading edge of the blade to facilitate movement of the blade through earthen formations. Also, the blade is provided with a plurality of spaced inclined elevator devices for urging the soil adjacent the blade upwardly as the blade moves therethrough to relieve the soil adjacent the extruder cone and thereby facilitate formation of the tunnel passage therethrough. The method of the present invention includes treating the interior of the tunnel with a weighted low friction coefficient fluid or aqua gel to lubricate the passage to facilitate insertion of the pipe into the tunnel without damaging the coating on the pipe.

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3,788,086

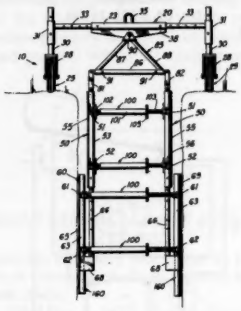
## PROTECTIVE BARRIER

James I. West, Jr., Jonesboro, Ga., assignor to Charter Enterprises, Inc., Jonesboro, Ga.

Filed Apr. 13, 1972, Ser. No. 243,769
Int. Cl. E21d 19/00
U.S. Cl. 61—41 A 9 Claims

A barrier for use in protecting workmen against a cave-in while working in a trench, including a pair of spaced upright wall means defining a protective area in which workmen can work. The barrier includes a wheel supporting carriage opera-

ble for suspending the spaced upright wall means in a trench so that the wall means can be advanced to selected working positions along the trench. Adjustable strut means is connected between the spaced upright wall means so that the spacing can be adjusted, with the strut means being operable



for maintaining the wall means in a set horizontal by spaced relationship during a working operation. The spaced upright wall means includes a plurality of selectively removable sections operable for increasing or decreasing the effective dimensions of the wall means so that the barrier can be utilized in a number of trenches of varying depths.

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**3,788,087**

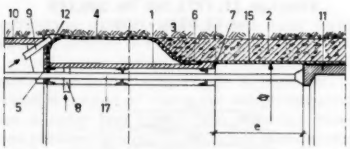
**METHOD AND APPARATUS FOR USE IN TUNNELLING**

**Pierre Patin, 58, rue de Sevres, Boulogne-sur-Seine, France**

**Filed Apr. 25, 1972, Ser. No. 247,363**

**Int. Cl. E21d *19/04***

**U.S. Cl. 61—84** **15 Claims**



During tunnelling the terrain is supported by an annular fluid mass under pressure moved either continuously or stepwise. A lining compound is introduced outside the fluid mass and sets to form a tube. The tube may then be internally coated.

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**3,788,088**

**DOUBLE ACTING EXPANDER ENDING AND CRYOSTAT**

**Axel G. Dehne, Los Angeles, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.**

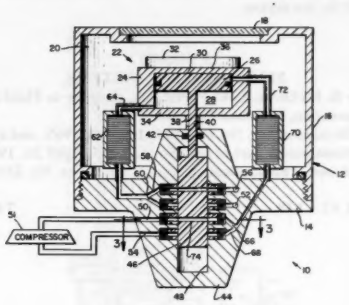
**Claims priority, application France, May 6, 1971, 71.16398**

**Filed Nov. 29, 1972, Ser. No. 310,301**

**Int. Cl. F25b *9/00***

**U.S. Cl. 62—6** **8 Claims**

Double-acting expander engine minimizes shuttle losses by having a cylinder at low temperature along its entire length, and minimizes pumping losses by requiring only a thin piston and minimizes conduction losses by providing a thin piston




rod. Refrigeration capacity is approximately doubled by the double-acting configuration.

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**3,788,089**

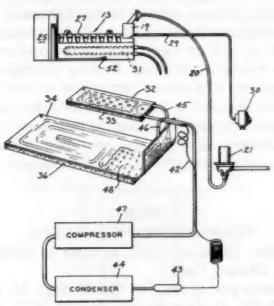
**COMBINATION ICE CUBE MAKER AND REFRIGERATOR**

**Richard A. Graves, Menomonee Falls, Wis., assignor to U-Line Corporation, Milwaukee, Wis.**

**Filed Nov. 8, 1971, Ser. No. 196,498**

**Int. Cl. F25c *1/04***

**U.S. Cl. 62—137** **9 Claims**




A combination ice cube maker and refrigerator includes an insulated compartment having an open front normally closed by a door. An automatic ice cube maker unit is disposed in an upper corner of the compartment and a freezer zone is defined about the ice maker by an L-shaped bracket, the horizontal portion of which defines a shelf and an upright portion of which defines a vertical divider. The refrigerator zone is below and to one side of the bracket. A first stage evaporator is disposed beneath and against the ice cube mold of the automatic ice cube maker unit and a second stage evaporator is positioned above the shelf portion of the bracket and defines a platform for a container which holds ice cubes ejected from the ice cube maker unit. The first stage evaporator is insulated from the freezer zone and the second stage evaporator is partially insulated from the shelf portion of the bracket. The shelf portion of the bracket has a series of openings which permit a controlled passage of cold air to the refrigerator zone beneath the shelf, and the upright portion of the bracket is provided with openings adjacent its top for the circulation of warmer air

from the refrigerator zone to the freezer zone. The operation of the refrigeration system which includes the evaporators and the operation of the ice cube maker unit is controlled by a single thermostatic switch which senses the temperature in the mold of the ice maker.

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**3,788,090**

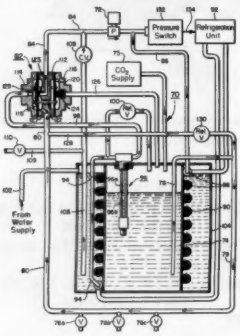
## FLUID CONTROL SYSTEMS

**George B. Richards, Lake Forest, Ill., assignor to Fluid Device Corporation, Highland Park, Ill.**

**Division of Ser. No. 840,119, June 19, 1969, and a continuation-in-part of Ser. No. 724,385, April 26, 1968, abandoned. This application Apr. 5, 1972, Ser. No. 241,152**

**Int. Cl. F25c** *1/00*

**U.S. Cl. 62—139** **7 Claims**




Temperature control of fluid flowing within a system is accomplished by sensing a change in fluid pressure loss in the system, as occurs on transition of the fluid in state, e.g., from liquid to solid or gas, or vice versa. In the preferred form, a refrigeration means cools fluid flowing through a conduit within the system. A pressure responsive control includes a pressure sensor coupled to the conduit for detecting a change in pressure loss attendant a change in fluid state and a signal developing element for regulating operation of the refrigeration unit according to the sensed pressure change.

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**3,788,091**

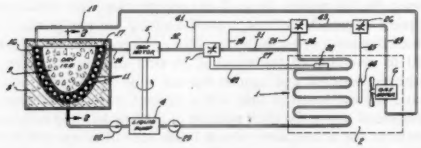
## THERMODYNAMIC CYCLES

**David T. Miller, Torrance, Calif., assignor to Statham Instrument, Inc., Oxnard, Calif.**

**Continuation-in-part of Ser. No. 75,337, Sept. 25, 1970, Pat. No. 3,693,370. This application Aug. 12, 1971, Ser. No. 166,316. The portion of the term of this patent subsequent to Sept. 26, 1989, has been disclaimed.**

**Int. Cl. F25b** *25/00*

**U.S. Cl. 62—175** **23 Claims**



This invention relates to thermodynamic cycles operating between two levels of subatmospheric temperature, whereby power is generated and/or refrigeration obtained, in which a heat transfer liquid is employed having a relatively high vapor pressure at atmospheric temperature.

**3,788,092**

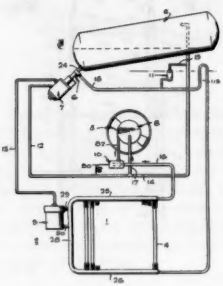
## THERMODYNAMIC CYCLES

**David T. Miller, Port Hueneme, Calif., assignor to Statham Instruments, Inc., Oxnard, Calif.**

**Continuation-in-part of Ser. Nos. 75,337, Sept. 25, 1970, Pat. No. 3,693,370, and Ser. No. 166,316, Aug. 12, 1971. This application July 18, 1972, Ser. No. 270,568The portion of the term of this patent subsequent to Sept. 26, 1989, has been disclaimed.**

**Int. Cl. F25b** *25/00*

**U.S. Cl. 62—175** **10 Claims**



This invention relates to thermodynamic cycles operating between two levels of subatmospheric temperature, whereby power is generated and/or refrigeration obtained, in which a heat transfer liquid is employed having a relatively high vapor pressure at atmospheric temperature.

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**3,788,093**

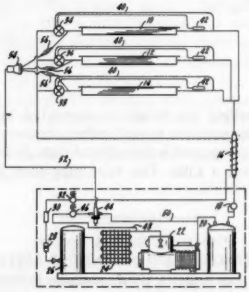
## HOT GAS BYPASS SYSTEM FOR A REFRIGERATION SYSTEM UTILIZING A PLURALITY OF EUTECTIC PLATES

**William E. Lauterbach, Evanston, Ill., assignor to Dole Refrigeration Company, Chicago, Ill.**

**Filed Apr. 21, 1972, Ser. No. 246,158**

**Int. Cl. F25b** *41/00*

**U.S. Cl. 62—200** **1 Claim**



A refrigeration system includes a plurality of hold-over plates of the type in which an eutectic is frozen by the use of a circulating refrigerant. The hold-over plates are in a closed refrigeration circuit with a compressor, condenser and

receiver. In order to provide continuous compressor operation at the lowest safe suction pressure after the eutectic is frozen, there is a hot gas connection between the compressor output and the plate input to bypass compressor discharge gas through each plate. This increases the velocity of the refrigerant flowing through the plates, as well as insuring that the evaporating pressure of the refrigerant does not go below a predetermined minimum danger point. Instead of operating below the minimum danger point or shutting off on low-pressure cut-out, the compressor continues to operate at an acceptable suction pressure to effectively reduce the temperature of air and product within the space being refrigerated.

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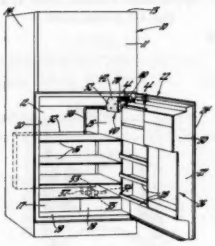
**3,788,094**

## WATERLINE RETRACTOR FOR REFRIGERATOR CABINET

**Louis D. Benasutti, Fairborn, and Joseph D. Chernek, Springfield, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.**

**Filed Dec. 1, 1972, Ser. No. 311,309**
**Int. Cl. F25d** *23/12*
**U.S. Cl. 62—339** **5 Claims**



A refrigerator cabinet having a cold water service area located in the exterior of the door having a water line leading from a cold water storage tank within the cabinet to a dispensing valve in the service area. A water line retractor mechanism is positioned within the refrigerator cabinet and includes a water line takeup reel resiliently biased in a retracted position allowing the water line to slide into and out of the cabinet without undue wear or crimping when the door is opened and closed.

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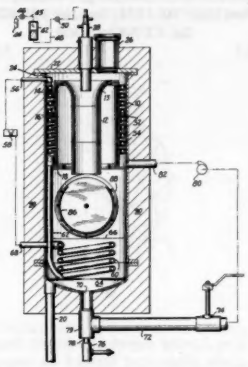
**3,788,095**

## SPRAY-FREEZING APPARATUS AND METHOD

**James L. Murphy, Jr.; Garland K. Grace, and Rudy E. Rogers, all of Huntsville, Ala., assignors to Thiokol Chemical Corporation, Bristol, Pa.**

**Filed May 25, 1971, Ser. No. 146,651**
**Int. Cl. F25c** *1/00*
**U.S. Cl. 62—347** **10 Claims**

An apparatus and method are disclosed for forming fine frozen particles of a solution by using a refrigerated liquid coolant in which the solution is insoluble and the coolant is continuously supplied to a downwardly sloping plate to form a thin film of coolant on a surface of the plate and a



nozzle is positioned to spray droplets of the solution against the thin film of coolant whereby the spray droplets of said solution are frozen by the coolant.

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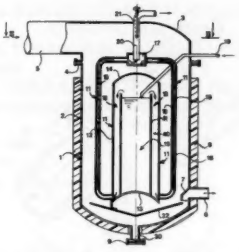
**3,788,096**

## CRYOGENIC GAS TRAPS

**Jacques Brilloit, Grenoble, France, assignor to L'Liquide Societe Anonyme pour L'Etude et L'Exploitation des Procedes Georges Claude, Paris, France**

**Filed July 12, 1972, Ser. No. 271,166**
**Claims priority, application France, July 16, 1971, 7126161**
**Int. Cl. B01d** *5/00*
**U.S. Cl. 62—55.5** **7 Claims**



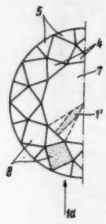
In a cryogenic gas trap for separating out at least one constituent from a flow of gas, the coefficient of exchange between a condensation surface and a cryogenic fluid which cools said surface is substantially improved by utilizing said fluid in the two-phase gas-vapour form. The gas trap comprises a first condensation surface formed by a nest of vertical metallic tubes arranged around ant at a distance from a second condensation surface constituted by a casing 12, in the interior of which is arranged a tank 15 containing the cryogenic liquid. The tubes communicate at one extremity with an annular conduit comprised between said casing and said tank, and at the other extremity with a manifold 17. The trap may be utilized in the general field of industrial vacuum: metallurgy under vacuum, metallization, distillation and vaporization under vacuum, drying under reduced pressure.

3,788,097

## BRILLIANT HAVING PLURAL RINGS OF FACETS, EACH HAVING AN ODD NUMBER OF FACETS

Maximo Elbe, Hamburg, Germany, assignor to Firma Colorant Schmuckstein G.m.b.H., Hamburg, Germany

Filed Mar. 30, 1971, Ser. No. 129,421
Int. Cl. A44c 17/00
U.S. Cl. 63—32 5 Claims




A brilliant gem having upper and lower facets which are inclined to a girdle plane and formed by lateral surfaces of pyramids. The angle between the lower facets and the girdle plane ranges from 37° to 45°, and is selected such that emerging light is dispersed in a dispersion angle of from 1° 20 minutes to 12° 57 minutes. The gem is also provided with a second plane parallel to the girdle plane, and contains an odd number of upper and lower facets in a ring of facets circling the gem.

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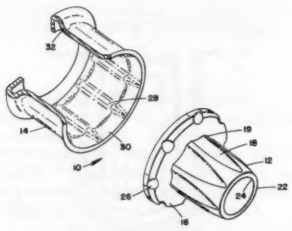
3,788,098

## END CAP FOR FLEXIBLE SHAFT COUPLINGS AND METHOD

Arthur W. Miller, Golden; Robert E. Stuemky, Elizabeth, and George E. Morse, Denver, all of Colo., assignors to The Gates Rubber Company, Denver, Colo.

Filed July 12, 1972, Ser. No. 271,096
Int. Cl. F16d 3/28
U.S. Cl. 64—11 R 10 Claims




An end cap for flexible shaft couplings of the tubularly shaped flexible element type that includes a flanged tapered hub having a plurality of axial grooves, and a corrugated outer sleeve axially aligned with the hub and having an end portion attached to the flange.

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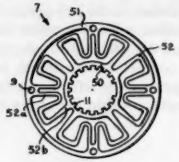
3,788,099

## FLEXIBLE COUPLING

Donald L. Miller, Horseheads, N.Y., assignor to The Bendix Corporation, Southfield, Mich.

Filed June 30, 1971, Ser. No. 158,352
Int. Cl. F16d 3/06
U.S. Cl. 64—12 3 Claims

A flexible coupling for transmitting torque from an axially movable rotary driving member to a coaxially arranged rotary driven member. The coupling has an inner ring, an outer ring, and a plurality of generally S-shaped interconnecting resilient arms which permit axial flexibility while simultaneously providing reasonably stiff bi-directional torque transmission. The S-shaped arms automatically compensate for any radial lengthening of the coupling that occurs when the driving member moves axially relative to the driven member during torque transmission.

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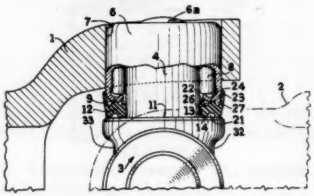
3,788,100

## SEALING DEVICE FOR A UNIVERSAL JOINT

Alfred Pitner, Paris, France, assignor to Nadella, Rueil-Malmaison, France

Filed Jan. 14, 1972, Ser. No. 217,901
Claims priority, application France, Feb. 1, 1971, 7103272
Int. Cl. F16d 3/26
U.S. Cl. 64—17 A 23 Claims




Sealing device for a universal joint comprising a sealing ring of elastomer extending around each trunnion and compressed between a shoulder of the trunnion and the needle retaining flange of a needle bearing interposed between the trunnion and a bore of the yoke branch. Each ring has two concentric annular portions which are in sliding sealing contact with the flange and are separated by at least one continuous groove whereby a suction effect is created between the sealing ring and the flange.

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3,788,101

## PATTERN DISC FOR TUBULAR MULTIPLE-DROP KNITTING MACHINES

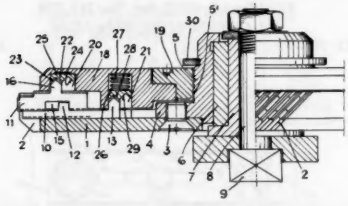
Paolo Orizio, Via Statale per Iseo, Rodengo-Saiano, Italy

Filed Dec. 20, 1971, Ser. No. 209,950
Claims priority, application Italy, Oct. 16, 1971, 5220/71
Int. Cl. D04b 15/76
U.S. Cl. 66—50 A 7 Claims

The improved pattern disc of the knitting machine of the invention, wherein a pattern disc is circularly operative about a

central hub, comprises a pair of jacks positioned within each radially inclined slot of the disc and capable of being positioned in either working or idle position without removal of the jacks and repositioning the same.

The pair of jacks are superimposed to each other, the upper having an intermediate tappet and a lower discharge slot and



the lower jack having an intermediate tappet in juxtaposition with said discharge slot and a terminal tappet. The greater length of the lower jack with respect to the upper one and the greater width of the discharge slot with respect to its opposite tappet permit the independent radial displacement of the jacks without need of removal when the weft of the knitting fabric is altered in design.

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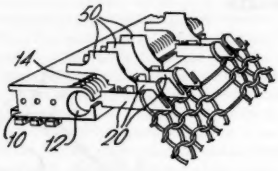
**3,788,102**

## HAND KNITTING DEVICE

**Lilian Richardson, 1616 Pendrell St., Vancouver, B. C., Canada**

**Filed Nov. 3, 1972, Ser. No. 303,643**
**Claims priority, application Canada, Nov. 29, 1971, 128834**
**Int. Cl. D04b** *7/00*
**U.S. Cl. 66—60** **13 Claims**



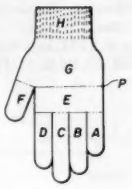
A manually operable knitting device having a needle holder and a plurality of latch needles. Each needle comprises a needle body and a sliding latch and is spring-loaded to bias the latch to an open position. The needle bodies are slidably connected to the needle holder for sliding movement relative thereto in a direction perpendicular to the needle axes. A needle actuating element is pivotally connected to each needle latch and is slidable therewith with respect to the needle body. Each needle body and the associated actuating element are provided with cooperating catch members which, when engaged, cooperate to hold the needle latch in a closed position against the biasing spring force. The needle holder is provided with a plurality of notches defining needle holding positions, and each needle actuating element has thereon a projection adapted to be engaged within one of the notches when the needle latch is in its open position. When engaged, the notch and projection elements prevent the needles from sliding relative to the needle holder.

**3,788,103**

## METHOD OF KNITTING GLOVES

**Fujio Asai, Anjo, Japan, assignor to Kabushiki Kaisha Matsuya Tekkoshe, Anjo-shi, Aichi, Japan**

**Continuation-in-part of Ser. No. 117,455, Feb. 22, 1971, abandoned. This application Nov. 13, 1972, Ser. No. 306,048**
**Int. Cl. D04b** *7/34*
**U.S. Cl. 66—65** **3 Claims**



A glove is knitted with a continuous knitting thread by a knitting machine in such a way that the pockets for the little, ring, middle and index fingers are each formed starting at that corner of the tip of each pocket located on the side closer to the outer side of the little finger, that the knitting-ends at the base of the pockets for the little, ring and middle fingers and of the intermediate body portion are each positioned at that corner located on the side same as that mentioned above, that the knitting end of the final course of each of the index finger and thumb pockets is positioned on the side opposite to the aforesaid knitting-end locations, and that the pockets for the ring, middle and index fingers are knitted by coupling -- in superposed relation -- two to three stitches of the base of their preceding adjacent finger pocket to the same number of stitches of the base of the adjacent finger pocket respectively. This new knitting method permits full automatic knitting of gloves without requiring any manual stitching or drawing-in of the leading end of the thread and obviates the development of wide-looped stitches at the joints of pockets.

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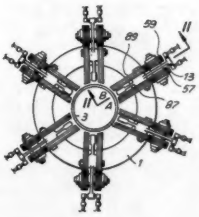
**3,788,104**

## YARN CHANGER FOR MULTI-FEED CIRCULAR KNITTING MACHINES

**Giorgio Billi, Fierenze, Italy, assignor to G. & C. Billi S.p.A., Firenza, Italy**

**Filed Jan. 15, 1971, Ser. No. 106,767**
**Claims priority, application Italy, Apr. 10, 1970, 9445 A/70**
**Int. Cl. D04b** *15/58*
**U.S. Cl. 66—138** **1 Claim**



A yarn changer for use upon a multi-feed circular knitting machine to present yarns to the needles of the machine at each of two adjoining feeds thereof, the yarn changer having a set of pivotally mounted yarn guides and a related indexable yarn guide control drum for each of the feeds; the sets of yarn guides being disposed on opposite sides of a central base support and pivotally supported on a first common shaft sup-

ported by, and extending outwardly, from both sides of the base, and the yarn guide control drums being disposed on opposite sides of the base and rotatably supported on a second common shaft, supported by, and extending outwardly from, both sides of the base.

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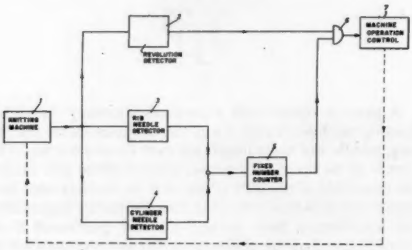
**3,788,105**

**NEEDLE MONITORING DEVICE FOR CIRCULAR KNITTING MACHINES**

**Peter Brose, Wolfratshausen, Germany, assignor to Firma Erwin Sick, An der Allee, Germany**

**Filed Mar. 8, 1972, Ser. No. 232,712**
**Int. Cl. D04b** *35/10*
**U.S. Cl. 66—157** **2 Claims**




A needle monitoring device for circular knitting machines comprises a sensing device for detecting the needles moving past said sensing device and for generating an impulse for each detected needle, a preselection counter pre-set to the correct number of the needles, and a feeler detecting start and end of each machine revolution. A logic circuit receives signals from said preselection counter and said feeler and delivers a warning signal when the pre-set number has not been reached after one revolution of the machine.

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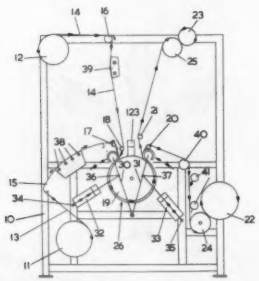
**3,788,106**

**APPARATUS FOR PRINTING ON TEXTILE FABRIC**

**Harry Edward True, Leicester, England, assignor to Harrico Developments Limited, Leicester, England**

**Filed Dec. 6, 1971, Ser. No. 205,006**
**Claims priority, application Great Britain, Dec. 9, 1970, 58427/70; May 13, 1971, 14860/71**
**Int. Cl. B44c** *1/00;* **D06p** *7/00;* **B41m** *5/26*
**U.S. Cl. 68—5 D** **12 Claims**



Printing of patterns on a textile fabric is performed by passing the fabric in continuous length together with a superposed heat activatable printing web around an arc of the periphery of a driven heated calender roller whilst being pressed against the roller around said arc by a stationary yieldable presser pad of complementary shape faced with heat resistant and substantially frictionless material, such as P.T.F.E. The invention provides apparatus for performing this procedure and also specially constructed presser pads.

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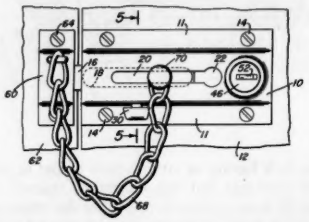
**3,788,107**

**DOOR LOCK**

**Aaron H. Lippman, Rochester, N.Y., assignor to Brainerd Manufacturing Co., Rochester, N.Y.**

**Filed June 9, 1972, Ser. No. 261,228**
**Int. Cl. E05b** *65/06;* **E05c** *17/36*
**U.S. Cl. 70—93** **3 Claims**



This is a three in one lock having a sliding bolt adapted to be engaged in a keeper, and having a keyed tumbler operated detent for locking the bolt against withdrawal from the keeper and for locking the bolt in released position, and having a headed pin which can be used as a chain door guard and which for this purpose is adapted to be inserted in an elongate slot in the bolt and which is secured to one end of a chain that is fastened at its other end to the keeper.

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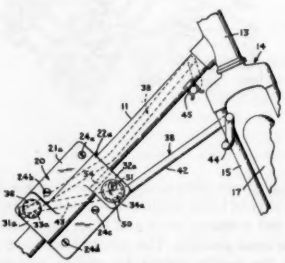
**3,788,108**

**LOCK FOR WHEELED VEHICLE**

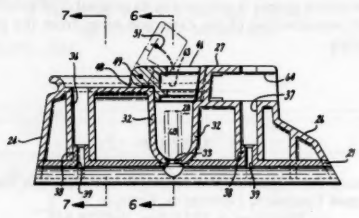
**Sterling E. Norcross, 19 Osborne St., Bloomfield, N.J.**

**Filed July 25, 1972, Ser. No. 274,861**
**Int. Cl. B62h** *5/06*
**U.S. Cl. 70—233** **7 Claims**



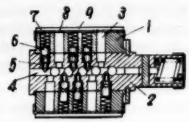
A device for holding at least one wheel assembly on a vehicle transverse to the longitudinal line of the frame of the vehicle has a support means connected to the frame on which is pivotly mounted an elongated locking bar movable from a disengaged position to a position of engagement with the wheel assembly. A locking assembly spaced from the pivotable connection of the locking bar includes, latching means to releasably hold the locking bar in the engaged position until the latching means is released. The latching means is operatively associated with a lock means for releasing the locking bar from the engaged position.

3,788,109
VEHICLE SECURING DEVICE
Gerald H. Lane, 1350 Holiday Lane No. 240, Fairfield, Calif.
Filed Dec. 5, 1972, Ser. No. 312,301
Int. Cl. E05b 71/00; B62h 5/16
U.S. Cl. 70—234 4 Claims



A vehicle securing device for attachment to the perimeter of a spoked vehicular wheel houses a bicycle lock, shielding it from tampering and disabling the wheel from rolling action.

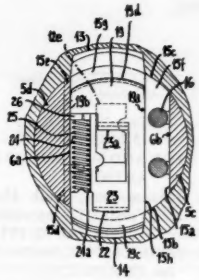
3,788,110
PIN-TUMBLER LOCK CYLINDER
Kazuhiro Sugae, Osaka, Japan, assignor to Showa Sargent Ltd.
Filed Dec. 9, 1971, Ser. No. 206,397
Claims priority, application Japan, Dec. 9, 1970, 45/123514; Dec. 9, 1970, 45/123515
Int. Cl. E05b 27/06
U.S. Cl. 70—358 2 Claims



A lock cylinder is formed having a plurality of projections extending from the periphery of its body in radial directions and having a plurality of pin bores spaced apart by a predetermined distance. The pin bores extend to a keyway in a rotatable barrel housed in the body. Tumbler pins, driver pins and springs are inserted in a desired number of selected pin bores, whereby the lock cylinder is adapted for a vast number of different locking combinations. The rear end of the barrel incorporated in the lock cylinder extends outward from the body of the lock cylinder. Within the keyway, at the extension thereof, there is provided a slidable locking plate which is usually urged by a spring into engagement with a latch portion formed in the body to prevent the rotation of the barrel. The locking plate thus serves as a pick-proof means and is freed from locking engagement when a key is inserted into the keyway and acts as an actuating member for the locking mechanism when the barrel is rotated.

3,788,111
KEYLOCK
Roger Ernest Parlier, Villa Prelac, Perroy, Switzerland
Filed Feb. 8, 1972, Ser. No. 224,534
Claims priority, application Switzerland, Feb. 24, 1971, 2636/71
Int. Cl. E05b 15/14, 29/02
U.S. Cl. 70—364 R 4 Claims

A lock of the pin tumbler type having locking blades within a rotating cylinder. The locking blades extend on both sides of the cylinder and lock the cylinder against rotation when the key is withdrawn. Locking grooves in the frame receive the blades to prevent rotation. The locking edges of the blades, and the groove edges, are inclined slightly from the axis motion of the blades so that, in the locking position, the edges of

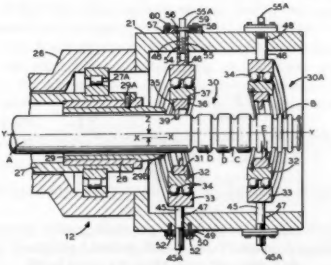


the blades are wedged against the groove edges, preventing even the slightest rotation of the cylinder.

3,788,112
MECHANICAL SHAPING
Jack M. Beigay, Freeport; Edward G. Choby, Jr., Pittsburgh, both of Pa., and Joseph S. Kaferle, Ashtabula, Ohio, assignors to Allegheny Ludlum Industries, Inc., Pittsburgh, Pa.
Continuation-in-part of Ser. No. 25,589, April 3, 1970, abandoned. This application Mar. 10, 1972, Ser. No. 233,783
Int. Cl. B21c 3/14, 23/24; B21j 3/00
U.S. Cl. 72—46 18 Claims

A method of mechanically shaping a metallic object, which comprises the steps of, coating a metallic object with a ductile, polyvinyl acetate and/or polyvinyl alcohol, non-metallic polymer base material having a maximum thickness of 0.1 mil, and increasing the length of the coated metallic object while simultaneously reducing its cross-sectional area with a former which substantially surrounds its perimeter.

3,788,113
PROCESS AND APPARATUS FOR FORMING ANNULAR CORRUGATIONS IN METAL TUBING
Helmut Martin, Hannover, Germany, assignor to Kabel-und Metallwerke Gutehoffnungshutte Aktiengesellschaft, Hannover, Germany
Filed Dec. 2, 1971, Ser. No. 203,953
Claims priority, application Germany, Dec. 5, 1970, 2060024
Int. Cl. B21d 15/06
U.S. Cl. 72—77 4 Claims



A process and apparatus for forming annular corrugations in metal tubing, wherein a pair of corrugating die holders each carrying a corrugating die, are arranged in tandem relation; the metal tubing moving longitudinally for successive engage-

ment of the corrugating dies therewith to form successive sets of corrugations in the tubing, the corrugations of one set of corrugations alternating with corrugations of the other set of corrugations, whereby to maximize the speed of production of the corrugated tubing.

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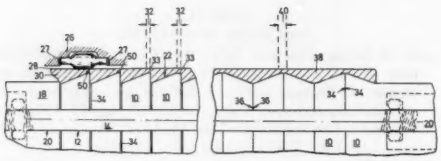
**3,788,114**
**APPARATUS FOR AND METHOD OF ROLLING ARTICLES**

**Jacob Marcovitch, Johannesburg, South Africa, assignor to Rotary Profile Anstalt, Vanduz, Liechtenstein**

**Continuation of Ser. No. 2,060, Jan. 12, 1970, abandoned. This application Oct. 8, 1971, Ser. No. 187,860**
**Int. Cl. B21d** *22/16*
**U.S. Cl. 72—83** **6 Claims**



This invention relates to methods and apparatus for forming annular articles such as the outer bearing races for taper roller bearings which are profil^d internally and in a radial plane of the members. The material is rolled on to a multipart mandrel and is cut therefrom. The mandrel parts are removed individually.

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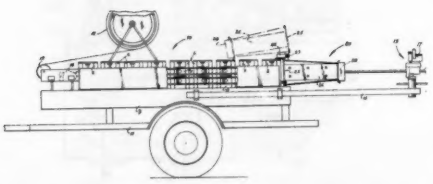
**3,788,115**
**EXTENSION FOR A MOBILE CONTINUOUS SIDING MACHINE**

**Glen E. Beymer, 83363 N. Enterprise, Creswell, Oreg.**

**Filed Nov. 3, 1972, Ser. No. 303,381**
**Int. Cl. B21d** *5/08*
**U.S. Cl. 72—181** **4 Claims**



An extension embodying a plurality of roll sets which may be swung into alignment with the rolls of a supporting siding machine to modify siding discharged by the machine. A framework of the extension is swingably mounted on the siding machine and rotatably supports a series of roll sets which progressively modify the siding passing along the framework. Locking means secures the extension in place, while adjustment means assures proper alignment of the extension and roll sets therein with the siding discharged by the machine proper. The machine proper is returned to its original configuration by simple repositioning of the extension away from the path of the siding.

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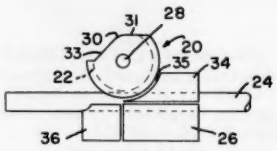
**3,788,116**
**TAILPIPE FORMING MECHANISM**

**Raymond John Fazzani, Pawtucket, R.I., assignor to The Torrington Company, Torrington, Conn.**

**Filed Sept. 8, 1971, Ser. No. 178,631**
**Int. Cl. B21d** *7/00*
**U.S. Cl. 72—296** **2 Claims**



A forming die is described for producing compound bends in tubing without removal from the machine or the use of special fixtures. This arrangement is achieved by providing cutaway sections for clearance of the compound bend adjacent to the die.

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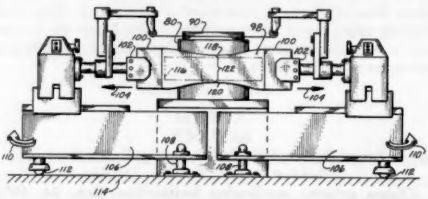
**3,788,117**
**METHOD OF FORMING HONEYCOMB**

**Frank S. Chester, Laguna Beach; Claude O. Johnson; Ira Keith Kavanagh, both of Fullerton, and Leonard R. Van Horik, Long Beach, all of Calif., assignors to McDonnell Douglas Corporation, Santa Monica, Calif.**

**Filed June 19, 1972, Ser. No. 263,861**
**Int. Cl. B21d** *11/02, 47/00*
**U.S. Cl. 72—296** **6 Claims**

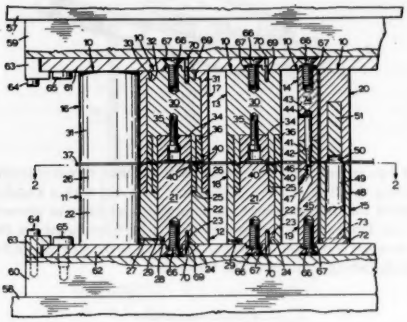


A method of stretch forming arcuate lightweight, rigid, honeycomb-type panels by providing uniform controlled elongation of both skins of the panel being formed instead of stretching the outer skin while compacting the inner skin in forming the curved surface.

## 3,788,118
## APPARATUS FOR PERFORMING FABRICATING OPERATIONS ON SHEET MATERIAL, AND A COMBINATION OF PUNCH AND DIE MEMBERS FOR INCORPORATION IN SUCH APPARATUS

**Eugene Stephen Joseph, 120 Newport Ave., Scarborough, Ontario, Canada**

**Filed Dec. 30, 1971, Ser. No. 213,967**
**Int. Cl. 83** *695;* **B21d** *43/28*
**U.S. Cl. 72—324** **24 Claims**



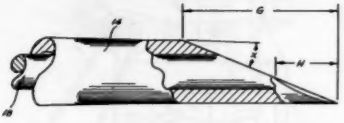
A press apparatus for forming knock-outs in sheet metal panels to be subsequently formed into electrical enclosures, in which the apparatus comprises a plurality of pairs of punch and die members with the punch and die members of each pair thereof being complementary. Each of these punch and die members is removably mounted in the apparatus by means of a screw-threaded member which is centrally located relative to the associated punch or die member and is disposed through a locating spigot which is presented by the punch or die member and is located within a complementary recess provided in the apparatus, at least some of these punch and die members each being further removably mounted in the apparatus by means of an anti-rotation locking pin which is disposed partially within a recess in the associated punch or die member and partially within a bore provided in the apparatus. The dimensions of and spacing between the screw-thread member and the anti-rotation locking pin by which each of the appropriate punch and die members are removably mounted in the apparatus are the same, so that the pairs of punch and die members, which are of different dimensions, may be removed and re-mounted in the apparatus in different positions, the screw-threaded member and anti-rotation locking pin by which each appropriate punch and die member is removably mounted in the apparatus being wholly within the periphery of said member as viewed in the direction in which said punch or die member and the other member of the appropriate pair thereof are operatively movable towards and away from one another, so that the punch and die members of adjacent pairs thereof may be disposed in contacting relationship with one another.

## 3,788,119
## METHOD OF FORMING SPINAL NEEDLE

**Anthony L. Arrigo, Libertyville, Ill., assignor to Baxter Laboratories, Inc., Morton Grove, Ill.**

**Filed Aug. 17, 1972, Ser. No. 281,573**
**Int. Cl. B21g** *1/08*
**U.S. Cl. 72—324** **5 Claims**

The present application discloses a procedure for forming a beveled tip on a needle assembly including a cannula and an obturator. The assembly is subjected to a swaging or drawing operation for drawing the cannula inner wall into substantial contact with the obturator thereby to frictionally immobilize the latter. In this condition the assembly is provided with a tip. Tipping results in the reduction of gripping friction so that the

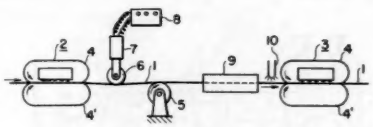


obturator may be released. The procedure provides an assembly having no appreciable clearance or mismatch between cannula and obturator thereby to substantially reduce incidence of coring of tissue being punctured.

## 3,788,120
## APPARATUS FOR HOT-STRETCHING STEEL WIRE AND CABLE

**Keinosuke Takeo, Osaki; Tomoaki Katsumata, and Akimitsu Hijikata, both of Itami, all of Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan**

**Filed Aug. 7, 1972, Ser. No. 278,323**
**Claims priority, application Japan, Aug. 7, 1971, 46/70839**
**Int. Cl. B21f** *9/00*
**U.S. Cl. 72—342** **2 Claims**



A pair of spaced caterpillars along a moving direction of steel wire or steel cable to be stretched, comprises a pair of chain-rollers which compressively contact each other and rotate in opposite directions. A heating apparatus is disposed between the caterpillars and a cooling apparatus is also disposed at another position between the caterpillars. One caterpillar is disposed forwardly of the other caterpillar in the moving direction of the steel wire or cable and driven at a higher velocity than that of the other caterpillar so that a predetermined tension is applied on the moving steel wire or cable between the caterpillars. Each chain-roller of the pair includes holder members which are provided in facing relation to and urged, under liquid pressure, against those of the other chain-roller. Each of the holder members has an upper part holding the steel wire or steel cable and a lower part connected to the chain-roller, the parts being formed of metal, and the upper part is supported by the lower part through a resilient plate.

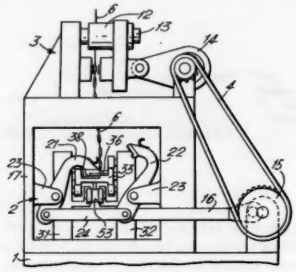
## 3,788,121
## APPARATUS FOR PRODUCING FOLDED STRIP MATERIAL

**John Massey Trihey, Balwyn, Victoria, Australia, assignor to Vulcan Australia Limited, Burwood, Victoria, Australia**

**Filed Sept. 14, 1971, Ser. No. 180,438**
**Claims priority, application Australia, Sept. 14, 1970, 2511**
**Int. Cl. B21d** *13/02*
**U.S. Cl. 72—381** **13 Claims**

Apparatus for forming zig-zag folded strip in which the strip is folded about anvil plates by means of alternately acting fold-

ing dies. Two anvil plates are provided and are moved into and out of position in synchronism with successive folding operations of the folding dies. The movement of the anvil plates is effected in a direction transverse to the plane of the strip.



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**3,788,122**

**BENDING MACHINE FOR WIRE OR STRIP**

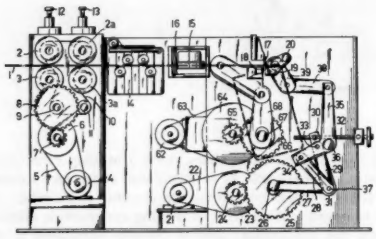
**Josef Ritter; Hans Gott; Klaus Ritter; Otto Gamillscheg; Wilhelm Boyer, and Gerhard Ritter, all of Graz, Austria, assignors to EVG Entwicklungs-und Verwertungsgesellschaft, M.b.H., Graz, Austria**

**Filed Dec. 12, 1972, Ser. No. 314,402**

**Claims priority, application Austria, Apr. 12, 1972, 3181**

**Int. Cl. B21d** *17/02*

**U.S. Cl. 72—384** **9 Claims**



The invention is concerned with a bending machine for wire or strip in which the raw material is advanced through the machine step by step and, between each step, a bend is made by a mobile bending tool. The bending tool is driven through a linkage which incorporates a control that can be operated whilst the machine is working to make a continuous adjustment to the working stroke of the bending tool and thus to the angle of bend made.

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**3,788,123**

**FLARING TOOL**

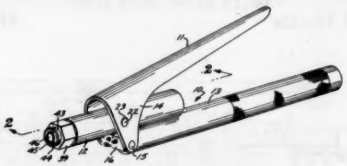
**Bulent Gulistan, Malibu, Calif., assignor to Deutsch Fastener Corp., Los Angeles, Calif.**

**Division of Ser. No. 59,273, July 29, 1970, Pat. No. 3,665,581, which is a division of Ser. No. 784,527, Nov. 29, 1968, Pat. No. 3,561,093, which is a continuation of Ser. No. 744,260, June 13, 1968, abandoned, which is a continuation of Ser. No. 578,728, Sept. 12, 1966, abandoned. This application Jan. 31, 1972, Ser. No. 221,934**

**Int. Cl. B21j** *15/34*

**U.S. Cl. 72—391** **9 Claims**

A flaring tool including a die adapted to engage the end of a sleeve and an element adapted to grip the shank of a fastener extending through the sleeve, with a tension force being applied to the shank and an inward force being applied to the die through the actuation of a lever. The gripping element is slidable in a body, with the lever being pivotally mounted on one side of the body. A spacer may be provided to render the die inoperative so that the tool may be used to force an interfering part into an opening in the workpiece without simultaneously bending the flange. Such a part may be a nut with a knurled exterior that becomes embedded in the workpiece to prevent the nut from rotating. A member may be substituted for the die to exert a pull on a fastener attached to the workpiece for accomplishing removal of the fastener.



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**3,788,124**

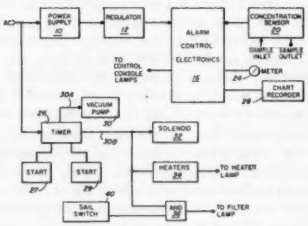
**GAS CONCENTRATION MEASURING**

**Alvan Teton, 32 Connolly St., Randolph, Mass.**

**Filed Dec. 20, 1971, Ser. No. 209,867**

**Int. Cl. G01h** *7/00;* **G08b** *21/00*

**U.S. Cl. 73—19** **11 Claims**



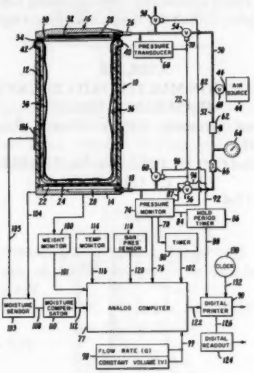

A method and associated apparatus for detecting a safe low percentage residual concentration of a sterilizing gas such as ethylene oxide being eluted from an item previously sterilized by the gas. The elution of the gas from the item may be accomplished by a heated forced air technique or, alternatively, by a vacuum technique. A concentration sensor is subjected to a sampled amount of the eluted ethylene oxide and preferably forms a branch of a bridge circuit which includes means for registering the amount of ethylene oxide eluted which is a function of the amount of residue still retained by the item. The concentration of ethylene oxide is preferably indicated by a meter in parts per million. When a safe low level of residue, such as 500 ppm (parts per million), is detected a SAFE indicator light may be illuminated or an audible alarm sounded. One aspect of the present invention is the provision for a set point control which can be adjusted to change the SAFE/UNSAFE concentration level to, for example, 300 ppm, or any other level considered acceptable.

3,788,125

## METHOD AND APPARATUS FOR MEASURING THE BULK DENSITY OF A MATERIAL UNDER PRESSURE

Werner P. Kirschstein, and John R. Wagner, both of Greensboro, N.C., assignors to Loew's Theatres, Inc., New York, N.Y.

Filed Jan. 28, 1972, Ser. No. 221,689
Int. Cl. G01n 9/32
U.S. Cl. 73—32 8 Claims



The bulk density of a body of tobacco or similar material maintained under pressure is determined by loading a body of the material of known weight into a flexible bag having an open end, sealing the open end of the bag to the walls of a container of a known volume, expanding the bag into engagement with the walls of the container to reduce the volume of the space between the bag and the container to substantially zero and then introducing a fluid into the space between the bag and the container at a controlled and known rate of flow for a time sufficient to compress the body of material under a known measured pressure. The time that it takes to reach the known pressure, multiplied times the flow rate of the fluid, yields the volume of the space between the container and the compressed body of material. The volume of that space is subtracted from the known volume of the container and divided by the known weight of the compressed material to yield the bulk density of the material. An automatic control system and monitoring and computer devices are employed to control the sequence of the method and to produce a final result as a digital print-out or readout.

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3,788,126

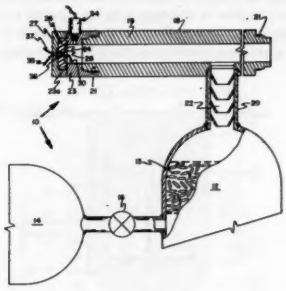
## PULSED END-BURNING T-BURNER

Edward W. Price, 511 B Lexington, and Homer B. Mathes, 36 B Vieweg Circle, both of China Lake, Calif.

Filed Mar. 28, 1973, Ser. No. 345,620
Int. Cl. G01n 33/22
U.S. Cl. 73—35 13 Claims

A device is provided for the purpose of measuring the oscillatory combustion response of burning propellants to imposition of incident pressure oscillations, and to measure the damping rate of imposed oscillations (primarily due to damping by particles or droplets of condensed phase reaction products). The method uses artificially imposed oscillations to permit measurement of effect of oscillation with propellants that do not spontaneously produce oscillations.

The propellant samples to be tested are bonded in place at opposite ends of a T-shaped burner such that burning takes place on the facing surfaces only. Samples are prepared with precise uniformity of thickness and ignited as uniformly as possible by igniting with a coating of "paint-on" pyrotechnic which ignites almost instantaneously when the pilot igniter material is started by an electrically heated bridge wire.



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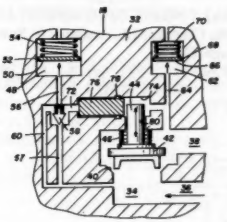
3,788,127

## LEAK DETECTION APPARATUS

Barry T. Marsh, Bridgeport, Conn., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed Dec. 28, 1971, Ser. No. 213,029
Int. Cl. G01m 3/26
U.S. Cl. 73—40 3 Claims



The improved fuel dispensing system described herein includes an improved leak detecting device located in a conduit between a remote fuel pump and a fuel dispenser. A valve is mounted in the dispenser to trap a portion of the fuel between the leak detection device and the valve. If a leak exists in the system, and that leak is above a predetermined rate, a piston in the leak detection apparatus shifts under a pressure differential to block a valve in the leak detection apparatus so that it cannot open and permit full flow. The operator of the dispenser will, upon the next operation of the dispenser, realize that a leak is present in the system due to the restricted flow. The leak detection apparatus is arranged so that the pressure of the trapped fluid is measured for a predetermined period of time. If a leak does not occur during this time, the system operates at full flow during subsequent operation. If a leak is detected during the measuring period, then the flow rate is severly reduced as previously mentioned.

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3,788,128

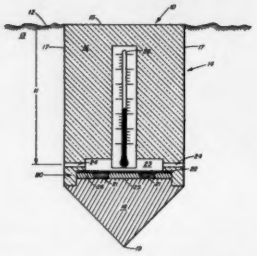
## HUMIDITY INDICATION

Daniel E. Strohecker, Galena, Ohio, assignor to Battelle Development Corporation, Columbus, Ohio

Filed Jan. 10, 1972, Ser. No. 216,711
Int. Cl. G01n 31/22
U.S. Cl. 73—73 17 Claims

An enclosure comprises a cylindrical transparent plastic upper portion defining a cavity at its lower end, hermetically

sealed to a pointed aluminum lower portion carrying an indicator that changes color with humidity. A transparent membrane, permeable to moisture and impermeable to bulk liquid, covers the indicator at its interface with the cavity. The device is driven into a region of soil that is to be planted several hours later, until the upper face is flush with the surface of the soil to locate small passages, communicating between the cavity and



the surrounding soil, at a predetermined depth. The indicator thus provides a measure of the humidity at that depth and is visible from above. A thermometer indicates the temperature of the cavity and the soil at that depth.

Just before planting, an optimum concentration of seeds is selected that will provide the desired yield at the relative humidity and temperature then indicated by the device.

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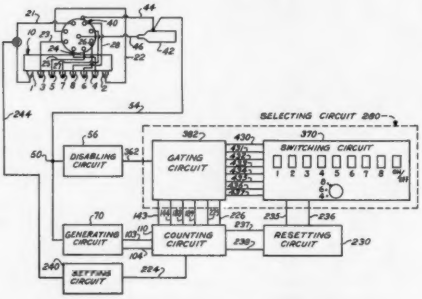
**3,788,129**

**SELECT SIGNAL ENGINE DIAGNOSING APPARATUS**

**Gerald C. Trussell, Chicago, Ill., assignor to Sun Electric Corporation, Chicago, Ill.**

**Filed June 24, 1971, Ser. No. 156,293**
**Int. Cl. G01l 3/26**
**U.S. Cl. 73—116** **7 Claims**




The disclosure describes apparatus for disabling selected cylinders of an internal combustion engine for diagnostic purposes. The system and apparatus are preferably used in connection with an engine that includes a source of periodic cycles of ignition signals. When used with such an engine, the apparatus prevents one or more predetermined ignition signals in each cycle from energizing engine components, such as spark plugs, which normally receive the ignition signals. In order to achieve this purpose, the preferred apparatus embodiment described in the disclosure comprises a clock pulse generator that generates a uniform pulse in response to the receipt of each ignition signal from the engine. Counting means, such as bistable flip-flop circuits, are used to produce counting states representative of the number of pulses received from the clock pulse generator. Adjustable resetting means are used to reset the counting means to a predetermined counting state after the counting means has counted through a predetermined number of counting states, such as the number of cylinders in the engine being diagnosed. Removable setting means are employed to set the counting means to an initial counting state in response to the receipt of an ignition signal from a predetermined engine component, such as a spark plug. Adjustable selecting means generate a disabling pulse in response to a predetermined counting state of the counter, so that a particular cylinder of the engine may be disabled. A disabling device, such as a triac, responsive to the disabling pulse, conditions a predetermined ignition signal in each engine cycle so that the corresponding engine cylinder is disabled, thereby aiding the diagnosis of the engine.

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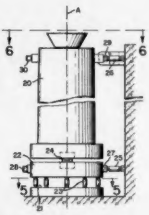
**3,788,130**

**LOW INTERACTION MULTI LOAD CELL SYSTEM FOR MEASURING THRUST**

**Alfred Newman Ormond, 11969 Riveria Rd., Sante Fe Springs, Calif.**

**Filed Oct. 18, 1972, Ser. No. 298,480**
**Int. Cl. G01l 5/13**
**U.S. Cl. 73—117.4** **4 Claims**



A plurality of vertically disposed load cells are positioned between a rigid plate and a platform riding on top of the load cells. A rocket engine whose thrust is to be measured has its nose coupled to the center point of the platform by a universal flexure and extends vertically above the platform. Additional load cells connect between a rigid structure and peripheral portions of the rocket for measuring side and roll forces. The plurality of load cells beneath the platform have end surfaces of convex configuration the radius of curvature of each which is preferably less than one-half the distance between the two bearing surfaces; that is, less than one-half the distance between the end engaging surfaces of the load cell. A negative coefficient of restitution to horizontal forces on the platform is thereby generated which effectively cancels the positive coefficient of restitution present when large forces are vertically applied to the platform.

This invention relates generally to load cell measuring techniques and more particularly to an improved low interaction multi load cell system for measuring thrust forces as might be generated by large solid propellant rocket engines.

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**3,788,131**

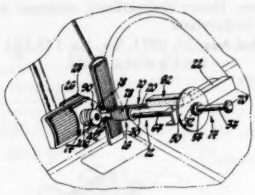
**PEDAL TRAVEL MEASURING TOOL**

**Francis J. Markey, Lewisburg, Ohio, assignor to General Motors Corporation, Detroit, Mich.**

**Filed Jan. 22, 1973, Ser. No. 325,512**
**Int. Cl. G01l 5/32**
**U.S. Cl. 73—132** **3 Claims**

A brake system inspection tool which measures the travel of a vehicle brake pedal during application of a specified pedal force. The tool includes a tubular frame assembly which is clamped to the brake pedal and a rod which is slidable relative to the tubular frame assembly and extends into engagement of the vehicle floor. A tube is located within the tubular frame assembly, surrounds the rod, and has a circular dial mounted on the end thereof. A pin carried on the rod extends laterally thereof through a helical slot in the tube and a straight slot in the tubular frame assembly to impart rotary movement to the

tube and dial upon movement of the tubular frame assembly relative to the rod and vehicle floor as the brake pedal is forcibly pivoted to actuate the brakes. The brake apply force



is applied against a force sensitive switch mounted on the frame assembly. The force sensitive switch is closed by a predetermined force applied thereagainst to signal the tool operator that the dial should be read.

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**3,788,132**

**TORQUE WRENCH**

**Lester B. Trimble, Downey, and Zygmunt J. Sopinski, Pico Rivera, both of Calif., assignors to Jo-Line Tools, Inc., Anaheim, Calif.**

**Filed Mar. 10, 1972, Ser. No. 233,577**
**Int. Cl. G01l** *5/24*
**U.S. Cl. 72—139** **1 Claim**

A torque wrench provided with a scale plate that is calibrated in both inch pounds and foot pounds or in both English and metric calibrations. A pointer extends through a slot formed in the plate and terminates in the same plane as the plate to thereby reduce parallax error in reading the torque indication.

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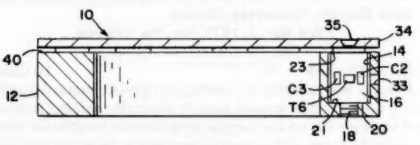
**3,788,133**

**FORCE SENSING TRANSDUCER**

**Owen Paelian; Donald R. Rister, and Richard L. Kellar, all of Huntsville, Ala., assignors to Toroid Corporation, Huntsville, Ala.**

**Filed Aug. 25, 1972, Ser. No. 283,780**
**Int. Cl. G01l** *1/22*
**U.S. Cl. 73—141 A** **6 Claims**



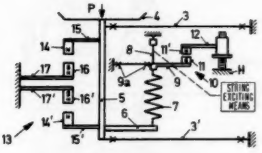

A force transducer consisting of a block of supporting material having a plurality of parallel cavities in which column shaped load cells having a small height to width ratio are mounted and wherein a thin hard sheet of material is bolted to the load cells. The load cells protrude over the surface of the block by an amount slightly larger than the deformation range of operation of the load cells.

**3,788,134**

**TEMPERATURE COMPENSATED MEASURING APPARATUS**

**Eugen Meier, Meilen, Switzerland, assignor to Mettler Instrumente, AG, Zurich, Switzerland**

**Filed Nov. 10, 1972, Ser. No. 305,173**
**Claims priority, application Switzerland, Nov. 23, 1971, 17022/71**
**Int. Cl. G01l** *1/04, 1/10*
**U.S. Cl. 73—141 AB** **5 Claims**




Force or length measuring apparatus including a movable member—such as a pan carrier—movably connected with a housing, and a measuring member—such as an oscillating string element or a traction spring—connected between said housing and said movable member for measuring the movement of said movable member, characterized by the provision of temperature compensation means including at least one pair of cooperating permanent magnets for applying to at least one of said movable and measuring members a biasing force of a magnitude and direction to compensate for temperature-responsive variations in a physical property of the measuring member, thereby to reduce the influence of variations in temperature on the resulting measurement.

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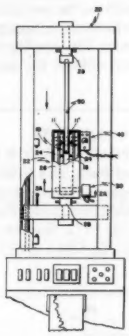
**3,788,135**

**PEEL ADHESION APPARATUS AND METHOD**

**Fred H. Hammond, Jr., Wellesley, Mass., assignor to The Kendall Company, Walpole, Mass.**

**Filed June 14, 1971, Ser. No. 152,559**
**Int. Cl. G01n** *19/04*
**U.S. Cl. 73—150 A** **9 Claims**



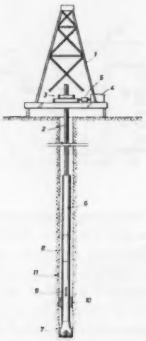
A peel adhesion test apparatus is disclosed which comprises a time-invariant linear temperature gradient member and a thermally conductive test specimen support removably associated with said temperature gradient member in a contiguous relationship therewith. The method for determining peel adhesion over a temperature range comprises affixing a composite comprising at least one peelable layer to a thermally conductive surface, providing said conductive surface with a time-invariant linear temperature gradient, peeling said peelable layer and measuring the peel adhesion along the direction of said temperature gradient.

3,788,136

## METHOD AND APPARATUSES FOR TRANSMISSION OF DATA FROM THE BOTTOM OF A DRILL STRING DURING DRILLING OF A WELL

Jack H. Park, Houston, Tex., assignor to Texaco Inc., New York, N.Y.

Filed Aug. 11, 1972, Ser. No. 279,899
Int. Cl. E21b 47/12
U.S. Cl. 73—151 21 Claims



Disclosed are a data transmission method and several devices for carrying out the method for transmitting logging or other measurements made downhole during a drilling operation to the surface of the earth, either in real time without interruption of the drilling operation, or during brief interruptions of the drilling operation but without the necessity of removing the drill string from the borehole. The system employs means for momentarily engaging the borehole while rotating the drill string, and recording the torque being applied to the rotating drill string by means of a surface positioned dynamic torque meter. Measurements made downhole are converted to pulse time electrical signals, and these electrical pulses are employed to activate the borehole engaging means so that torque pulses are generated which travel up the drill string and are sensed on the surface by the torque meter. By measuring the time between torque pulses as recorded by the surface torque meter the intelligence becomes readily available on the surface without the necessity of pulling the drill string.

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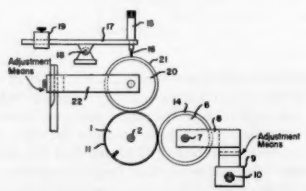
3,788,137

## METHODS AND APPARATUS FOR PAPER TESTING

William B. Lyon, Bethel Park, and William D. Schaeffer, O'Hara Township, Allegheny County, both of Pa., assignors to Graphic Arts Technical Foundation, Pittsburgh, Pa.

Filed Feb. 14, 1972, Ser. No. 225,890
Int. Cl. G01n 19/04
U.S. Cl. 73—159 8 Claims



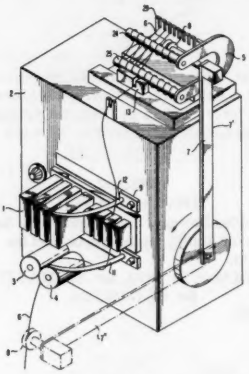

The specification discloses methods and apparatus to test the tendency of paper surfaces to be disrupted by the materials and forces applied to the paper during the printing process.

3,788,138

## TEXTILE-TESTING APPARATUS FOR MEASURING THE CROSS-SECTION OF YARNS ROVINGS AND SLIVERS AND PARTICULARLY FOR DETECTING FLUCTUATIONS IN CROSS-SECTION

Eduard Heusser, Uster, Switzerland, assignor to Zellweger Ltd., Uster, Switzerland

Filed Aug. 27, 1971, Ser. No. 175,683
Int. Cl. G01n 27/24
U.S. Cl. 73—160 5 Claims



In a textile testing apparatus, a rocker arm is provided which is pivotable about a pivot point between a conveying point and a testing point and a yarn gripper is disposed on one end of the rocker arm for selectively grasping the yarn. A testing arrangement is provided at the testing point having a plurality of spaced test devices each relating to different ranges of yarn sizes and guide means adjustable as to position for guiding the yarn to a selected test device.

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3,788,139

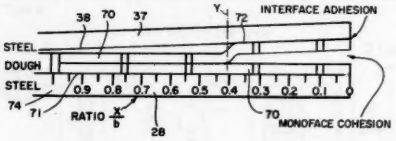
## METHOD AND APPARATUS FOR TESTING ADHESIVE PROPERTIES OF DOUGH-LIKE MATERIAL

Manuel Jesus Rubio, Bridgeport, Conn., and Victor Mario Leal, Monterrey, N.L., Mexico, assignors to Roberto Gonzalez Barrera, Monterrey, Mexico

Filed Nov. 3, 1971, Ser. No. 195,306
Int. Cl. G01n 3/24, 33/10
U.S. Cl. 73—169 10 Claims

Process and machine for testing dough-like materials adhesively contacted to spaced bars in generally parallel relation, and having a cut on the sample cross section lengthwise which is variable from end to end intermediate between the bars. Areas of the sample adhesively contacted to the bars have uniform width in the apparatus shown. As the bars move apart and apply tension to the sample, the dough-like material begins failing under monoface cohesion at the point where the intermediate lengthwise section of the sample is narrowest, said failure progressing toward the point where the intermediate lengthwise section of the sample is widest, and it fails under interface adhesion at one of the bars where the sample is widest, progressing toward the point at which the inter-

mediate lengthwise section of the sample is narrowest. When these two types of failures are superimposed or coincident, a




point is determined at which the adhesion and cohesion are equal. The testing machine involves acute angled cutters which establish the variable cross section of the sample.

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**3,788,140**

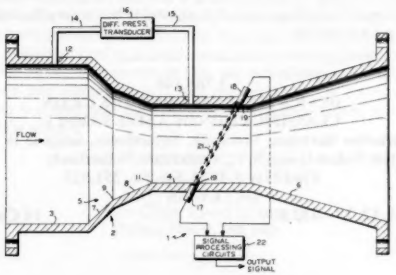
**ELECTROACOUSTICAL FLOW METERING APPARATUS**

**Quentin C. Turtle, Cranston, R.I., assignor to General Signal Corporation, Rochester, N.Y.**

**Filed Feb. 25, 1972, Ser. No. 229,352**

**Int. Cl. G01f *1/00***

**U.S. Cl. 73—194 A** **4 Claims**




The disclosure concerns electroacoustical flow metering apparatus in which the transponder probes define an acoustic path located in the throat of a differential pressure-producing flow metering device.

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**3,788,141**

**FLOW METER**

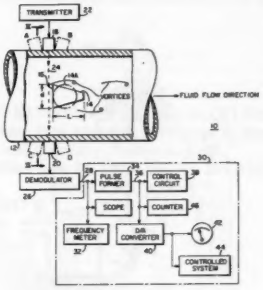
**Robert E. Blackwell, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Aug. 27, 1971, Ser. No. 175,463**

**Int. Cl. G01f *1/00***

**U.S. Cl. 73—194 B** **9 Claims**

Disclosed are a method and apparatus for determining the velocity of relative movement between a fluid and a body in the fluid around which the fluid divides and in front of which oscillations are generated in the fluid as a result of the meeting between the fluid and the frontal aspect of the object. An acoustic signal is propagated toward the fluid oscillations in front of the object for interaction with the fluid oscillations to thereby modulate the acoustic signal, and the modulated acoustic signal is picked up by a transducer which converts it to a corresponding signal having a variable that is a function of




the relative velocity between the fluid and the object. The corresponding signal is employed to determine the relative velocity by operating indicators in response to the signal or by controlling some process variable in response to the signal, for example a variable of relative fluid flow as by valve control of a fluid in a conduit, or speed control of an object in the fluid.

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**3,788,142**

**VELOCITY FLOWMETER**

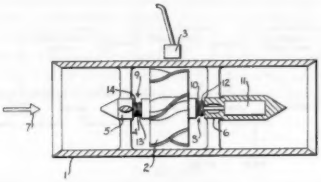
**Nils Paul Goransson, Hjulsbro, Sweden, assignor to Saab-Scania Aktiebolag, Linkoping, Sweden**

**Filed June 7, 1972, Ser. No. 260,384**

**Claims priority, application Sweden, June 11, 1971, 7575/71**

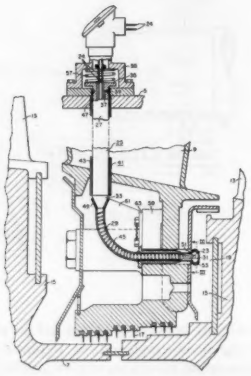
**Int. Cl. G01f *1/12***

**U.S. Cl. 73—230** **3 Claims**



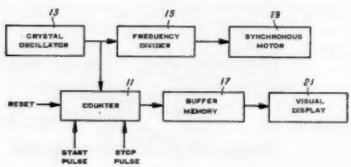
A flow meter comprises a screw turbine having its axis parallel to stream flow, to be rotated thereby. The turbine carries axially oppositely facing clutch members and is free for limited axial movement. When rotating too fast for stream flow, it moves upstream, engaging one clutch member against a cooperating fixed clutch element, and is thereby decelerated. Rotating too slowly, its downstream drift engages the other clutch member against a second cooperating clutch element which is motor driven to rotate faster than highest expectable turbine speed, for acceleration of turbine rotation.

3,788,143
INTERSTAGE DISC CAVITY REMOVABLE TEMPERATURE PROBE
Frank K. Gabriel, Springfield, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.
Filed Mar. 17, 1972, Ser. No. 235,579
Int. Cl. G01k 1/14
U.S. Cl. 73—346 9 Claims



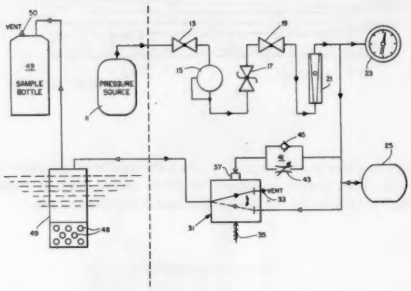
A temperature probe for gas turbines, the probe having a flexible end which is inserted through the casing, a stationary blade and an arcuate tubular guide to enter an interstage disc cavity adjacent a rotor blade disc to determine the temperature of a gaseous coolant within the cavity to indicate the temperature of the rotor blade disc.

3,788,144
PRESSURE MEASURING APPARATUS AND METHOD
Harold A. Armand, Houston, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.
Filed Dec. 27, 1971, Ser. No. 212,455
Int. Cl. G01l 7/04
U.S. Cl. 73—411 10 Claims



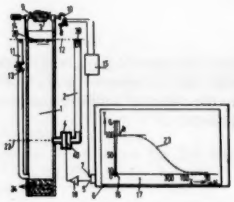

In a pressure measuring apparatus of the type wherein one end of a Bourdon tube spiral is deflected in response to pressure applied at the other end of the spiral, the applied pressure is measured as a function of the time required for a uniformly rotating object to rotate through the angle of deflection. An opto-electrical system is employed to optically detect the deflection angle and electronically count the number of pulses of a reference oscillator signal which occur during the time required to uniformly rotate through the detected angle. A display device is calibrated to display the count of the counter in actual pressure units.

3,788,145
LIQUID SAMPLING
Malcolm F. Irwin, West Chester, Pa., assignor to Pro-Tech Inc., Malvern, Pa.
Filed Mar. 14, 1973, Ser. No. 341,319
Int. Cl. G01n 1/14
U.S. Cl. 73—421 B 5 Claims




Equipment for sampling liquid at intervals controllable by adjusting the rate of accumulation of sample-propulsion fluid is provided with means for extending the intervals at which samples are taken and the duration of the taking of such samples. A pressure-responsive switching valve effective to interconnect accumulated propellant to a sampling locus in the liquid at a given accumulated pressure is partially shielded from sensing the pressure drop resulting from such interconnection, thus extending the period required for the pressure to reaccumulate to the switching level. The range from shortest to longest sampling interval is adjustable by varying the degree of such shielding.

3,788,146
DEVICE FOR ANALYSING THE GRAIN CLASSIFICATION OF A SOIL SAMPLE
Cornelius Hartman, Vreeswijk, Netherlands, assignor to Ballast-Nedam Groep N.V., Amsterdam, Netherlands
Filed May 9, 1972, Ser. No. 251,829
Int. Cl. G01n 15/06
U.S. Cl. 73—432 R 10 Claims



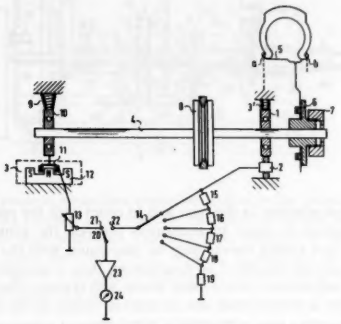
A device for analysing the grain classification of soil samples includes sedimentation and compensation pipes, both of which are filled to a common level with liquid. A pressure difference pick up device connects the compensation pipe to the sedimentation pipe at a region above the lower end of the latter and provision is made for dumping a soil sample into the sedimentation pipe. After the sample is dumped, the levels of liquid in the two pipes are equalized either by means of an overflow pipe and stop valve connected with the sedimentation pipe or by a throttle flow connection between the two pipes.

3,788,147

## DEVICE FOR THE BALANCING OF OUT OF BALANCE BODIES ESPECIALLY VEHICLE WHEELS

Richard Muller, Worfelden, Germany, assignor to Gebr. Hofman KG Maschinenfabrik, Darmstadt, Germany

Filed July 29, 1971, Ser. No. 167,260
Claims priority, application Germany, July 29, 1970, P 20 37 732.6
Int. Cl. G01m 1/22
U.S. Cl. 73—459 7 Claims



This invention relates to a device for balancing out-of-balance bodies, particularly motor vehicle wheels, wherein the unbalance is determined in two planes of correction a and b, which has sliding and clamping means by which the out-of-balance body can be so displaced and clamped on a main shaft that the correction plane a will coincide with one of the two main shaft bearings, said bearing being adapted as a radially fixed swing bearing and the other bearing being radially movable and connected to a transducer and measuring means and an indicating instrument so that the out-of-balance is determined and eliminated in a first measuring run in correction plane b whereupon the out-of-balance is ascertained in correction plane a.

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**ERRATUM**

For Class 73—517 see:
Patent No. 3,788,149

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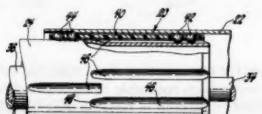
3,788,148

## ENERGY ABSORBER FOR COLLAPSIBLE STEERING COLUMNS OR THE LIKE

Lehman J. Connell, Frankenmuth, and Jeffrey L. Johnson, Saginaw, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed July 10, 1972, Ser. No. 269,941
Int. Cl. B62d 1/18
U.S. Cl. 74—492 5 Claims



A collapsible steering column for automobiles includes an energy absorber of the rollable deformer ball type and in which certain of the complement of deformer balls are sized predeterminedly with relation to the remainder of the ball complement and located in preformed recesses between the two telescopic tubes of the absorber so as to be inactive during a first portion of column collapse in which the remainder of the ball complement are active to provide a first level of the ball complement are active to provide a first level of energy absorption, whereafter in a later portion of column collapse the said certain balls engage in interfering relation between the walls of the tubes to provide a second level of energy absorption.

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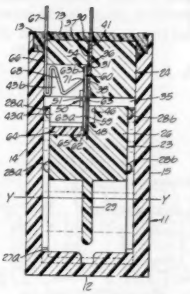
3,788,149

## LOW COST RESISTANCE GAUGE ACCELEROMETER

Leslie B. Wilner, Palo Alto, Calif., assignor to Becton, Dickinson Electronics Company, Pasadena, Calif.

Filed June 26, 1972, Ser. No. 266,410
Int. Cl. G01p 15/12
U.S. Cl. 73—517 R 27 Claims



A low cost accelerometer is provided for use in mounting on an automobile or other movable object to produce an output signal which will operate an emergency device if the acceleration of the object reaches or exceeds a predetermined unsafe value. The accelerometer employs a strain sensitive element in the form of a thin, and hence fragile, piezoresistive semiconductor element having its respective ends secured to a pair of hinged support members that rotate relative to each other thereby straining the element longitudinally in response to acceleration. An overload release engages the support structure to limit the hinge action to preclude straining the strain sensitive element beyond the breaking point when the accelerometer is subjected to acceleration forces in excess of the normal operating range for which the accelerometer is designed.

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3,788,150

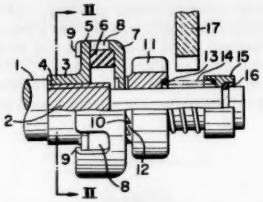
## INERTIA SLIDING TYPE INTERNAL COMBUSTION ENGINE STARTER

Tsuyoshi Matsumoto, Himeji, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Sept. 28, 1972, Ser. No. 293,000
Claims priority, application Japan, Jan. 25, 1972, 47/10567
Int. Cl. F02n 11/00
U.S. Cl. 74—7 R 3 Claims

An inertia sliding type internal combustion engine starter having a rotary shaft upon which is located a driving plate, the two elements being interengaged via helical splines. A second plate is driven by the first plate, the second driven plate also interengaging a pinion via ratchet gear teeth. Rotation of the

rotary shaft rotates and translates the various components to their starter position, the pinion engaging an engine ring gear



to attain starting. If starting is incomplete, the inertia of the elements maintain such in their starter positions thus preventing the phenomenon of earlier retreat.

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**3,788,151**

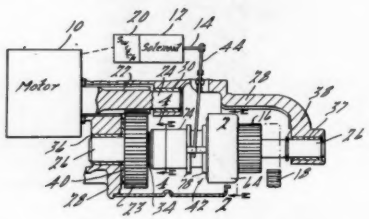
**SHOCK ABSORBING STARTER CLUTCH MECHANISM**

**Walter J. Campau, Grosse Pointe Woods, Mich., assignor to Chrysler Corporation, Highland Park, Mich.**

**Filed Oct. 6, 1972, Ser. No. 295,752**

**Int. Cl. F02n** *11/00*

**U.S. Cl. 74—7 A** **7 Claims**



In a geared starter unit used in motor vehicles resilient shock absorbing members are interposed in the space between the driver and the driven members of the starter clutch unit for transmitting torque from the starter motor through the overrunning clutch to the ring gear and for absorbing the high impact loads developed by engine backfiring from being applied from the ring gear back through the clutch to the driver member.

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**3,788,152**

**INDEXED TV TUNER**

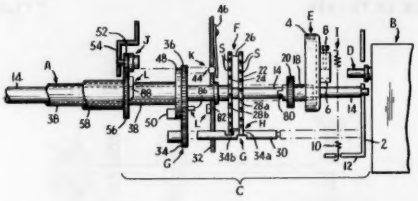
**Carroll R. Miner, Wilbraham, Mass., assignor to General Instrument Corporation, Newark, N.J.**

**Filed July 17, 1972, Ser. No. 272,369**

**Int. Cl. F16h** *35/18, 27/04*

**U.S. Cl. 74—10.15** **46 Claims**

A tuner for tuning a TV set or the like to a selected one of a plurality of predetermined frequencies provides, between the tuning knob and the electrical tuning element, a transmission means which functions on an indexing basis, as distinguished from a detenting basis. The transmission means is biased to rotate in one direction and a plurality of stop surfaces are presented thereto, each of those stop surfaces corresponding to a particular predetermined frequency to be tuned, the biasing means urging the transmission means i[n] engagement with the selected stop surface, thereby to appropriately position the tuning element. When, as is preferable, a display means is provided to indicate the channel or station tuned, a low-force detenting means may be associated with the display means, but it has no significant effect on the operation of the indexing feature of the transmission means. To that end, only a fraction of the total movement of the tuning knob for effecting a shift in tuning from one station to the next is actually employed to accomplish the tuning shift, the remainder of that motion being an idling motion. A crank operating against a plate having peripheral recesses defining the aforementioned stop surfaces enables the same structure to function both to move the index means carrying the stop surfaces from one



operative position to the next and to coact with the operative stop surface in order to accurately position the tuning element. Fine tuning means may be associated with the tuning means above described so functioning that a particular fine tuning adjustment, when once made, will remain effective as the tuner is shifted from one channel or station to the next. A novel positive stop permitting a very compact construction is also provided.

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**3,788,153**

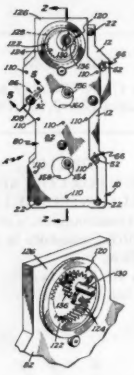
**DEVICE FOR TRANSPORTING FILM THROUGH A SERIES OF ROLLERS**

**Conrad E. Lee, Mound, Minn., assignor to Pako Corporation, Minneapolis, Minn.**

**Filed Sept. 15, 1972, Ser. No. 289,435**

**Int. Cl. F16h** *21/14*

**U.S. Cl. 74—68** **3 Claims**



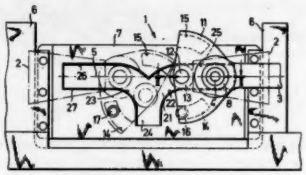
Driving means for transporting sheet material between a series of companion rollers rotatable in opposite directions and which are rotatably mounted in bearing means and rotated by cranks acting between certain of said rollers and a driving plate and gears between said driven rollers and the other rollers together with means for guiding the plate in circular and rectilinear movement, an internal ring gear fixed relative to said plate and a spur pinion whose pitch diameter is one half of that of the ring gear meshing with the ring gear and whose axis of rotation is fixed relative to the bearing means.

3,788,154

## DEVICE FOR PRODUCING A SWIVELLING MOTION IN A LINEARLY MOVING MEMBER

Wilhelm Haberle, Industriegelande/Scheer, Germany

Filed Aug. 29, 1972, Ser. No. 284,629
Claims priority, application Germany, Sept. 13, 1971, P 21 45 700.1
Int. Cl. F16h 21/44
U.S. Cl. 74—99 7 Claims



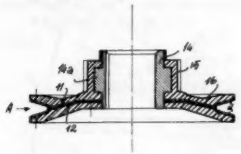
The present invention provides a device for producing a swivelling motion in a linearly movable structural member which is also rotatable. The structural member is provided with a guide member which, in turn, is arranged in such a manner that it is displaced with respect to the axis of rotation and bears against a cam.

3,788,155

## REINFORCED MOLDED PLASTIC PULLEYS

Vincenzo Cigala, Strada Valpiana 13, and Emilio Alberto Bertinetti, via Alberto Picco 33, both of Torino, Italy

Filed Mar. 27, 1972, Ser. No. 238,330
Claims priority, application Italy, Sept. 7, 1971, 69971 A/71
Int. Cl. F16h 55/36
U.S. Cl. 74—230.01 5 Claims



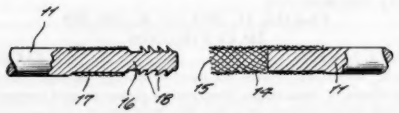
Pulleys made of plastic material may be improved in their stress - and heat resistance by embedding within the body of the pulley and parallel to the faces thereof a diaphragm suitably made of metal, fiber glass or mixtures thereof.

3,788,156

## EASILY INSTALLED BELT

Burtis R. Jackson, c/o George Spector 3615 Woolworth Building 233 Broadway, New York, N.Y.

Filed June 26, 1972, Ser. No. 266,344
Int. Cl. G01f 3/02; F16g 1/00
U.S. Cl. 74—238 1 Claim



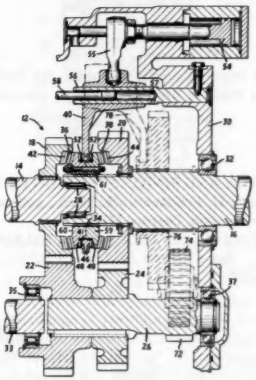
A temporary replacement for a car endless fan belt, the device consisting of a single length of durable rubber belt that can be stretched to fit around a pump pulley and a crank shaft pulley, so that the car can proceed to travel in case its regular fan belt is broken, thus permitting the automobile reach a Service Station for assistance, one end of the rubber belt having a tubular wire mesh secured therearound and extending therefrom, while the other end of the belt has a male member secured thereto which has a series of barbs projecting radially therefrom, so that when the male member is fitted in the tubular wire mesh on the other end of the belt, the barbs hold the ends securely together.

3,788,157

## TRANSMISSION SHIFTING APPARATUS

Paul E. Carlson, Williamsport, and Ralph U. Schimmel, Hagerstown, both of Md., assignors to Mack Trucks, Inc., Allentown, Pa.

Filed May 15, 1972, Ser. No. 253,492
Int. Cl. F16h 3/08; F16d 11/04, 23/12
U.S. Cl. 74—364 11 Claims



Apparatus for clutching two rotatable elements together. The rotatable elements are mounted for rotation about respective axes and are selectively coupled together by a shifter clutch member. The clutch member is preferably splined to one rotatable element so as to rotate therewith and be axially movable in and out of clutching engagement. The other rotatable element and the clutch member are provided with teeth on their facing sides which may be engaged to couple this element with the clutch member and, in turn, couple the two rotatable elements together. According to the invention, the clutch member is provided with two continuous, spaced, lateral engaging surfaces extending generally perpendicular to its axis of rotation. These surfaces coact with corresponding mating surfaces of an axially movable shifting element, preferably through the intermediary of antifriction bearings. The shifting element is thus effective to apply an axial force to the clutch member to shift the clutch member by applying uniform pressure against one of the clutch member engaging surfaces.

3,788,158

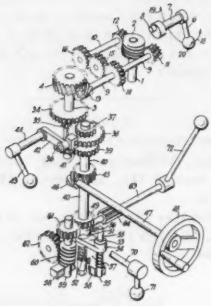
## TRIP DEVICE FOR USE IN A FEED MECHANISM OF A MACHINE

Arthur Jose Firth, Colchester, England, assignor to 600 Machine Tools Limited, London, England

Filed Feb. 22, 1972, Ser. No. 227,805
Claims priority, application Great Britain, Feb. 25, 1971, 5431/71
Int. Cl. F16d 7/02
U.S. Cl. 74—412 TL 7 Claims

In the quill feed mechanism of a milling machine, a trip device which disconnects the drive if the quill meets an unyielding obstruction, comprising a pivoted housing carrying

a gear which forms part of the feed mechanism, an angled face clutch and a latch mechanism arranged so that when an abnormal torque is imposed on the said gear, the latch mechanism disengages so that the housing pivots to disconnect the feed drive.



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**3,788,159**

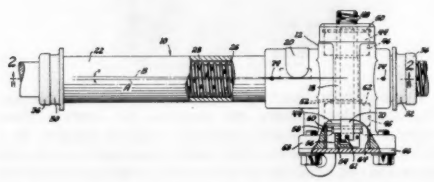
**RACK AND PINION STEERING GEAR**

**Ernest M. Plant, II, Frankenmuth, Mich., assignor to General Motors Corporation, Detroit, Mich.**

**Filed Oct. 30, 1972, Ser. No. 301,869**

**Int. Cl. F16h *1/04*; B62d *1/20***

**U.S. Cl. 74—422** **8 Claims**



A rack and pinion steering gear for automotive vehicles and the like includes a relatively short pinion housing, an elongated rack guide tube received wwthin a somewhat overlarge longitudinal bore of the pinion housing and which in turn receives a reciprocable rack member meshingly engaged by a pinion on a pinion shaft mounted in a cross bore of the pinion housing, with the rack guide tube being adjustable positionally within the overlarge housing bore in directions radially, axially and tiltably therewithin to effect proper sdjustments of the mesh of the rack and pinion and the preload therebetween.

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**3,788,160**

**OPERATING MECHANISM FOR A MOTOR VEHICLE SLIDING ROOF**

**Werner Sielk, Cologne, Germany, assignor to Ford Motor Company, Dearborn, Mich.**

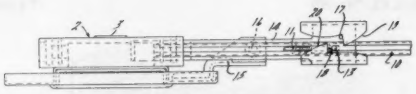
**Filed June 12, 1972, Ser. No. 261,897**

**Claims priority, application Germany, Nov. 24, 1971, 2158193**

**Int. Cl. F16c *1/10***

**U.S. Cl. 74—501 R** **2 Claims**

An operating mechanism for the sliding roof panel of a motor vehicle, which roof panel can be moved through the medium of a push-pull cable itself displaceable by means of a hand-operated crank. Displacement of the cable in the forward direction when the sliding roof panel is closed, raises the rear edge of the roof. Displacement of the cable in the rearward direction, when the roof is closed, lowers the sliding roof and moves it rearwards.



The cable is provided with a projecting abutment cooperating with a lever arm provided with a pair of spaced stops selectively engageable by the cable carried abutment. By means of a lever operable manually, the position of the lever arm carrying the abutments may be altered so as to enable cable movement only in one direction.

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**3,788,161**

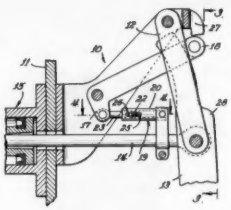
**MECHANICAL LINKAGE**

**Frederick A. Krusemark, 303 S. Second Ave., Maywood, Ill.**

**Continuation-in-part of Ser. No. 86,080, Nov. 2, 1970, abandoned, which is a continuation-in-part of Ser. No. 524,115, Feb. 1, 1966, Pat. No. 3,410,152. This application Feb. 24, 1972, Ser. No. 229,001**

**Int. Cl. G05g *1/14***

**U.S. Cl. 74—516** **20 Claims**



An arm connected to a push rod for moving a work load. The upper end of the arm is operably in contact with a movable fulcrum which is free to move downward whereby on its downward movement, the effort to move the work load is progressively reduced as the fulcrum moves downward.

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**3,788,162**

**PSEUDO-ISOTROPIC FILAMENT DISK STRUCTURES**

**David W. Rabenhorst, Clarksville; Alan Brandt, Columbia; Kenneth E. Darnell, Silver Spring, and James F. George, Bethesda, all of Md., assignors to The Johns Hopkins University, Baltimore, Md.**

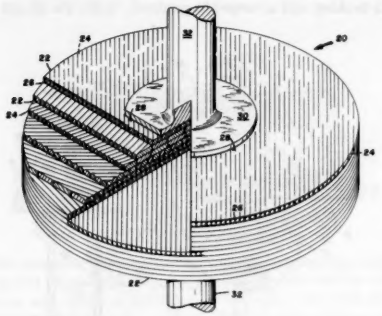
**Filed May 31, 1972, Ser. No. 258,303**

**Int. Cl. F16c *15/00***

**U.S. Cl. 74—572** **23 Claims**

The invention relates to inertial energy storage devices comprised of anisotropic filamentary elements and comprises several embodiments of a disc flywheel which, although consisting essentially of anisotropic elements, is effectively isotropic in total structural character. A preferred embodiment of the invention is generally formed by orienting several discrete annular layers of anisotropic filamentary elements at

regular angles to each other, each anisotropic element in any one annular layer being parallel to the remaining elements in



said layer. A second embodiment of the invention comprises randomly oriented anisotropic filamentary elements disposed within a rotary disc structure.

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**3,788,163**

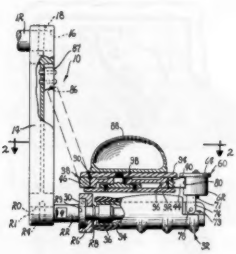
**MANUAL ACTUATOR**

**Raymond L. Gause, Huntsville, and C. G. Glenn, Arab, both of Ala., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.**

**Filed June 27, 1972, Ser. No. 266,771**

**Int. Cl. G05g** *1/16*

**U.S. Cl. 74—594.6** **4 Claims**



An actuator for an exercising machine employable by a crewman aboard a manned spacecraft. The actuator is characterized by a force delivery arm projected from a rotary input shaft of an exercising machine and having a force input handle extended orthogonally from its distal end. The handle includes a hand-grip configured to be received within the palm of the crewman's hand and a grid pivotally supported for angular displacement between a first position, wherein the grid is disposed in an overlying juxtaposition with the hand-grip, and a second position, angularly displaced from the first position, for affording access to the hand-grip, and a latching mechanism fixed to the sole of a shoe worn by the crewman for latching the shoe to the gr'd when the grid is in the first position.

**3,788,164**

**TRANSFER GEAR ASSEMBLY**

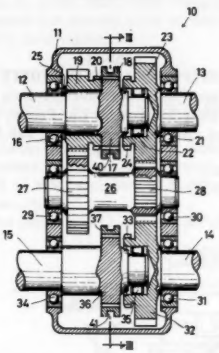
**Kenji Ojima, Toyota, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya City, Aichi Pref., Japan**

**Filed June 28, 1972, Ser. No. 267,186**

**Claims priority, application Japan, July 7, 1971, 46/050613**

**Int. Cl. F16h** *37/06, 3/08*

**U.S. Cl. 74—665 T** **6 Claims**



A transfer gearing assembly for a vehicle which provides a plurality of different speed ratio power trains, more particularly, only rear wheels drive and both front wheels and rear wheels drive selectively. The present invention particularly resides in improvement of two clutch means for connecting the input shaft with the output shafts or releasing it therefrom so that the operation of one of said two clutch means with a single manual actuation may cause the operation of the other clutch means.

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**3,788,165**

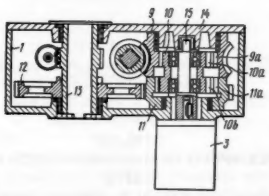
**TWO-SPEED DRIVE**

**Grigory Naumovich Klotsvog, ulitsa Mokhovaga, 26, kv. 9, Leningrad, U.S.S.R.**

**Filed Aug. 17, 1971, Ser. No. 172,414**

**Int. Cl. F16h** *37/06*

**U.S. Cl. 74—675** **3 Claims**



A drive for controlling valves comprising a worm-gear speed reducer whose worm is rotated by an electric motor and whose worm wheel is connected by a planetary reduction gear

to the output shaft of the drive. The planetary reduction gear is comprised of a planet pinion engaged with internal tooth rims respectively formed on the worm wheel and on a gear wheel meshing with the output shaft of the drive. A change of the torque on the shaft switches the control circuit of the electric motor thus changing the rotation speed of the output shaft.

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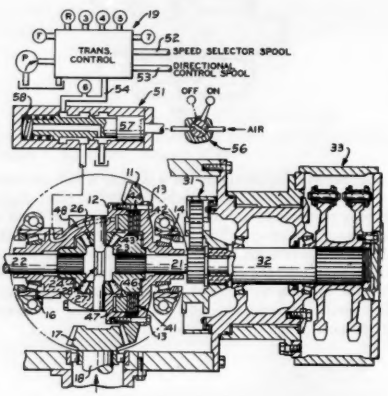
**3,788,166**

## SPEED RESPONSIVE LOCKING DIFFERENTIAL

**Cullen P. Hart, and Paul C. Rosenberger, both of Decatur, Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.**

**Filed Apr. 28, 1972, Ser. No. 248,574**
**Int. Cl. F16h** *1/44*
**U.S. Cl. 74—710.5** **1 Claim**




A locking differential assembly for vehicles including a hydraulically operated disc clutch for locking the differential assembly and a control system for the clutch associated with a transmission having speed range selection means, the control system normally permitting differential operation in high operating speed ranges of the transmission while actuating the clutch to normally prevent differential operation in low operating speed ranges, the control system also including a manually operable override control to selectively establish differential operation in low speed range settings of the transmission.

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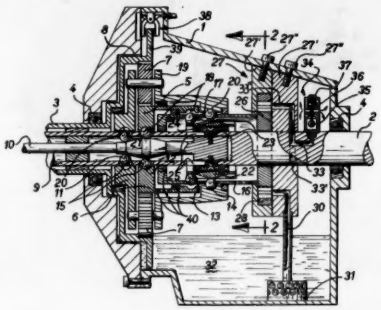
**3,788,167**

## MULTIPLE-SPEED TRANSMISSION WITH REVERSE DRIVE

**Yvon Beaudoin, and Claude A. Gingras, both of Dosquet, Quebec, Canada, assignors to said Gingras, by said Beaudoin**

**Filed Aug. 2, 1973, Ser. No. 277,309**
**Int. Cl. F16h** *57/10*
**U.S. Cl. 74—762** **6 Claims**

Transmissions adapted in particular for small and relatively inexpensive applications and particularly for a safe forward and reverse multiple-speed drive for snowmobiles, all terrain vehicles, passenger vehicles, trucks and the like. A transmission including a single planetary gear set with the output shaft directly secured to the ring gear and having one of the sun gear and the planet carrier selectively driven by an input shaft and a braking unit arranged to gradually brake the planet carrier, or the sun gear, for reverse drive or forward drive respectively. An axially displaceable control member selectively locks either of the sun gear and the planet carrier to the braking unit for braking action thereby. The braking unit consists of a gear pump having a stator secured to the transmission casing and a rotor which is gradually braked by the centrifugal action on a valve controlling the outflow of the gear pump.



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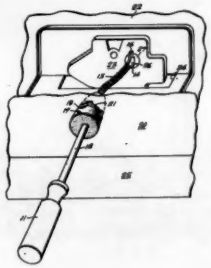
**3,788,168**

## AUTOMOBILE TRUNK LOCK OPENING TOOL

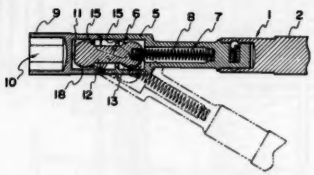
**Eugene B. Steinmann, Jr., 13100 N.W. 19 Ave., Miami, Fla.**

**Filed Nov. 27, 1972, Ser. No. 309,727**
**Int. Cl. B25b** *13/50*
**U.S. Cl. 81—3 R** **8 Claims**



A tool for temporary use in unlocking automobile trunks during body repair for proper fit and alignment of a trunk door with respect to the associated car body is described. A rigid, elongated tool shank portion has a handle at one end and a flexible shaft portion at the other end terminating in a flat shaft tip portion adapted to be received within the rotary slot of the door catch release mechanism at the inner panel of the door. A resilient attachment member frictionally slidable along the rigid shank portion is provided with a plurality of grooves of graduated size adapted to inter-engage within the lock cylinder opening in the inner panel of the door for retaining the tool in place to permit unlocking of the lock mechanism in substitution for the lock cylinder by turning the tool handle.

3,788,169
**BOX WRENCH**
Eiji Nakayama, 1140, Nishiyokkamachi, Sanjo, Japan
Filed June 28, 1972, Ser. No. 266,896
Int. Cl. B25b *13/00*
U.S. Cl. 81—177 UJ 1 Claim




This invention relates to a box wrench comprising an operational rod of which a center portion is formed into an angled portion and which is provided at its lower end with an expanded portion having a concave chamber with an inner opening at its bottom, a box having a hexagonal chamber at one side and a concave chamber at an other side; the rear end of said box being butted to the lower end of said expanded portion of said operational rod, a joint member being provided at both ends with spherical portions being to be inserted respectively in said concave chambers, a spring being inserted in said inner opening and fixed to the bottom thereof at its one end and to one of said spherical portions of said joint member at its other end.

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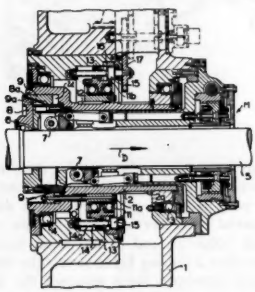
3,788,170
**MECHANISM FOR RADIAL ADJUSTMENT OF TOOLS IN ROTARY TUBULAR TOOL HOLDERS OF SHAVING MACHINES OR THE LIKE**
Franz Riedel, Solingen, Germany, assignor to Th. Kieserling & Albrecht, Sollingen, Germany
Filed Oct. 29, 1971, Ser. No. 193,858
Claims priority, application Germany, Dec. 3, 1970, 2059565
Int. Cl. B23b *5/00, 25/00*
U.S. Cl. 82—20 8 Claims



A shaving machine for tubular or rod-like workpieces has a tubular tool holder which is rotatable in two axially spaced main antifriction bearings installed in the machine frame. An auxiliary antifriction bearing surrounds the tool holder between the two main bearings and its inner race is coupled by rods with a sleeve which is movable axially of the tool holder in the region of one main bearing. The sleeve has a conical internal surface abutting against complementary conical surfaces of several equidistant supports for shaving tools which are caused to move radially in response to axial movement of the sleeve. The outer race of the auxiliary bearing carries several nuts which mesh with axially parallel feed screws mounted in the machine frame and coupled to each other for simultaneous angular movement by means of pinions provided on the feed screws and meshing with an internal gear which is rotatable in the frame. A reversible electric motor can be drivingly connected with a gear on one of the feed screws by way of either one of two gear trains which can rotate the one feed screw at different speeds. As the one feed screw rotates in the frame, it causes the other feed screws to rotate to the same extent and in the same direction to thereby move the outer race of the auxiliary bearing axially of the tool holder. The outer race shifts the inner race which changes the axial position of the supports for shaving tools so that the tools move radially outwardly or inwardly.

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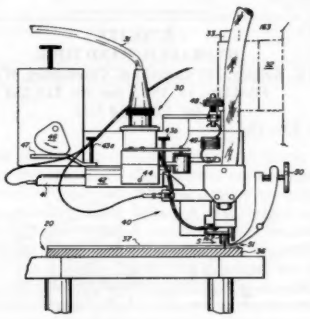
3,788,171
**PROJECTION SCREEN FABRICATION APPARATUS AND METHOD**
Harvey O. Hoadley; Robert N. Wolfe, both of Rochester; Beverly F. Palmer, Webster, and Roger S. Vanheyningen, Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.
Filed Dec. 13, 1971, Ser. No. 207,383
Int. Cl. B26d *3/06*
U.S. Cl. 83—5 7 Claims



A method and apparatus for fabricating projection screen masters from which highly efficient projection screens of improved aesthetic quality can be replicated. The cutting stylus of a sound-recording head is used to cut a plurality of contiguous grooves in the surface of a blank master. A signal of predefined waveform but of random frequency is applied to to the cutting stylus to modulate the cutting depth thereof in such a manner as to produce image light-redistribution microelements of various sizes but of substantially identical optical power.

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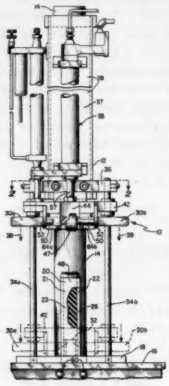
3,788,172
**TEAR CUTTER**
William T. Jones, Barberton, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio
Filed June 26, 1972, Ser. No. 266,002
Int. Cl. B26d *3/08, 7/06*
U.S. Cl. 83—9 3 Claims

Apparatus for preparing a specimen of elastomeric compound for a physical test thereof in which the specimen in the form of a rectangular prism is split to provide an area subject to tearing as two portions of the prism are pulled apart by an Instron or like testing machine. A two-part fixture supports the specimen and two coplanar knives in spaced apart relation are moved longitudinally of the specimen and of the fixture to slit the narrow longitudinal edges of the prism leaving an uncut test area therebetween.

The foregoing abstract is not to be taken as limiting the invention of this application, and in order to understand the full



nature and extent of the technical disclosure of this application, reference must be made to the accompanying drawing and the following detailed description.

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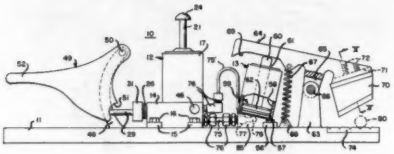
**3,788,173**
**HYDRAULIC HAND TOOL**
**Ronald E. Keigley, 219 Laurel Ln., Clarksburg, W. Va.**
**Filed Dec. 15, 1972, Ser. No. 315,281**
**Int. Cl. B26d** *5/12*
**U.S. Cl. 83—554** **11 Claims**



The specification discloses a hydraulic pressure operated hand tool of the type in which manual pressure exerted on a small-area pump piston creates a hydraulic pressure which is communicated to a power cylinder for activating a hand tool jaw member, such as a cutter blade. Preliminary take-up movement of the cutter blade into contact with the object to be severed, such as cables, pipe etc., is effected by manual pressure applied to a second pump piston of relatively large area, which causes rapid displacement of the hydraulic medium from a reservoir to the power cylinder before exertion of manual pressure to the small-area pump piston. A push-button valve when pressed causes instant return displacement of hydraulic medium via a by-pass communication from the cylinder to the reservoir to relieve the activating pressure on the cutter blade and restore it promptly to normal position.

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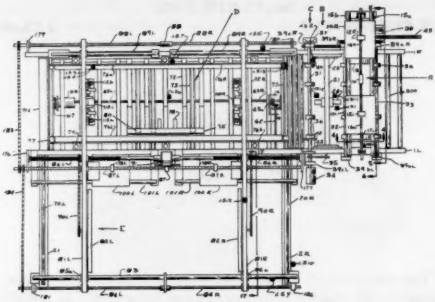
**3,788,174**
**MACHINE FOR TRIMMING THE EDGES OF PANELS**
**Donald B. Morse, and Bernard A. Pribish, both of Joliet, Ill., assignors to Kemlite Corporation, Joliet, Ill.**
**Division of Ser. No. 99,135, Dec. 17, 1970. This application Dec. 15, 1972, Ser. No. 315,494**
**Int. Cl. B26d** *1/12;* **B27b** *5/04*
**U.S. Cl. 83—79** **10 Claims**

A machine for trimming the edges of panels wherein a first conveyor mechanism passes the panels past a pair of saws for trimming the side edges of the panels and a second conveyor mechanism passes the panels past a second pair of saws for trimming the end edges of the panels. The machine has transfer mechanism for transferring the panels from the first



conveyor system to the second conveyor system. The machine includes a device for severing the web between the panels as they pass through the machine, and includes also a device for turning the panels over when they have been trimmed.

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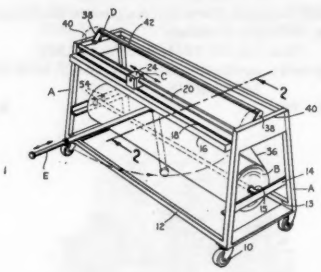
**3,788,175**
**CUTTING APPARATUS**
**Ira K. Davis, Columbia, S.C., assignor to Sam B. Fowler, Lugoff, S.C.**
**Filed Aug. 25, 1971, Ser. No. 174,617**
**Int. Cl. B26d** *7/06*
**U.S. Cl. 83—83** **4 Claims**



An apparatus for cutting and dispensing sheet material from a roll of material comprising rack means carried by a pair of standards for supporting an elongated roll of sheet material. The sheet material is fed over a cutting surface under a pressure bar which holds an end of the sheet material on the cutting surface after a cutting blade severs the sheet material. An arm extends outwardly from adjacent the middle of the cutting surface for measuring the length of the material to be cut. The arm also provides means over which the material can be automatically folded upon cutting.

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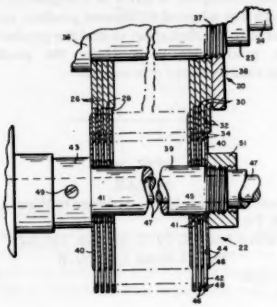
**3,788,176**
**CLAM SLICING MACHINE**
**Earl M. Glass, Baldwin, N.Y., assignor to Howard Johnson Company, Boston, Mass.**
**Filed May 24, 1972, Ser. No. 256,341**
**Int. Cl. B26d** *4/04*
**U.S. Cl. 83—114** **19 Claims**

A feed cylinder comprising a plurality of spaced parallel discs providing peripheral slots of a predetermined depth and

a plurality of circular cutter blades supported for rotation in the slots. The feed cylinder and cutter blades are supported for rotation on spaced parallel shafts, the shaft supporting the cutter blades being movable relative to the shaft supporting the feed cylinder to permit adjusting the degree of intermesh of the slots and cutter blades. An adjustable stop provides for determining the degree of intermesh and a spring yieldably



holds the cutter blades at a predetermined position of adjustment. There are stripper rings loosely mounted on the shaft on which the cutter blades are mounted between the cutter blades which are free to turn relative to the cutter blades for clearing the latter and a guide for controlling displacement of the stripper rings. The edges of the discs constituting the feed cylinder are perpendicular to the side surfaces and the edges of the cutter blades are inclined relative to the side surfaces.

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**3,788,177**

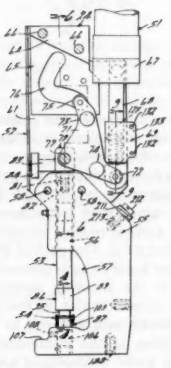
**FORMING TOOL AND FIXTURE THEREFOR**

**Robert W. Williamson, 62701 Haven Ridge Rd., New Haven, Mich.**

**Filed July 2, 1971, Ser. No. 159,176**

**Int. Cl. B26d** *5/08*

**U.S. Cl. 83—454** **13 Claims**



A forming tool and fixture therefor that is adapted to perform a variety of work functions on a workpiece and which lends itself to rapid relocation and change in function. A forming tool is constructed as a compact member including a force amplification device. Due to the compact construction, a number of the forming tools may be juxtaposed to each other so as to perform work functions on closely adjacent areas of the workpiece. The tool may function as a punch and an improved and simplified stripper arrangement is provided for the punch which stripper uses an elastomeric member. The tool may function as a punch and embodies a die structure that facilitates rapid and convenient adjustment in the location of the formed hole. The fixture for the tool includes a supporting or mounting bracket that facilitates convenient adjustment of the tool in a variety of planes. A novel clevis is also provided for accommodating a connection between the shaft of an actuator and the driven element.

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**3,788,178**

**MACHINE FOR CUTTING RIGID FOAM BLOCKS**

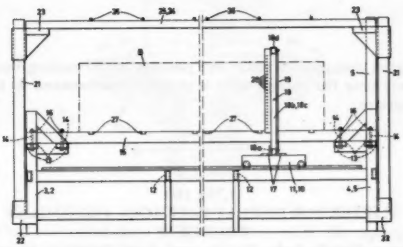
**Wolfgang Pantel, Stuttgart, Germany**

**Filed July 14, 1972, Ser. No. 272,048**

**Claims priority, application Switzerland, July 28, 1971, 11131/71**

**Int. Cl. B26d** *7/10*

**U.S. Cl. 83—171** **2 Claims**



A machine for cutting elongate rigid foam blocks using cutting wires through which an electrical current flows for heating thereof. A first group of such cutting wires extending in transverse direction being arranged at a vertical support frame of a horizontal support mechanism of the machine frame, the support frame being displaceable in the lengthwise direction of a block which is to be cut. A second set of such cutting wires likewise extends in the transverse direction at a horizontal support frame which can be moved up and down at the machine frame. According to the invention the support mechanism consists of longitudinally extending beams arranged at a lateral spacing from one another, the end portions of which are mounted at transverse beams of the machine frame. A lower transverse portion of the vertical support frame extends beneath and past the lengthwise extending beams and a third set of cutting wires is present which are arranged at the vertical support frame and which extend from the top towards the bottom through the lengthwise extending beams of the support mechanism.

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**3,788,179**

**CUTTING PRESS**

**Raymond G. Vallier, Brookfield, Wis., assignor to Western States Envelope Company, Milwaukee, Wis.**

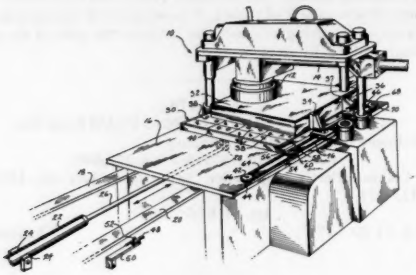
**Filed May 1, 1972, Ser. No. 249,092**

**Int. Cl. B26d** *7/20*

**U.S. Cl. 83—437** **7 Claims**

A cutting table is movably mounted on a frame for reciprocal movement between two positions, and a cutting die is positioned to overlie one position of the cutting table. A cutting board which is mounted on top of the cutting table comprises a plurality of rectangular sections which are positioned in side-by-side relationship in a substantially flat tray. The rectangular sections are fitted loosely enough into the tray so that they can be moved from position to position to present an altered cutting surface to the cutting die. An eccentric shaft driven by a chain is mounted on the cutting table and engages the cutting board to cause minor shifting of the cutting board

when the chain is moved. The chain engages a ratchet which is positioned to engage a pawl on the frame. The pawl moves the



ratchet and thereby shifts the position of the cutting board every time the cutting table is reciprocated between its two positions.

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**3,788,180**

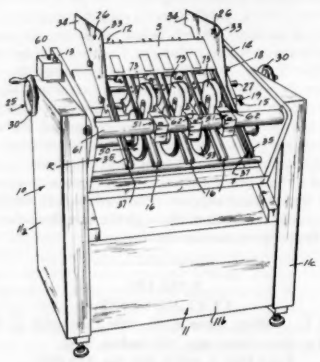
**SLITTER FOR DISPLAY PACKAGES AND SIMILAR PRODUCTS**

**George Potsch, Lake Zurich, and Karl Friedrich Poetsch, McHenry, both of Ill., assignors to Sun Industries Incorporated, Fox Lake, Ill.**

**Filed Nov. 10, 1971, Ser. No. 197,205**

**Int. Cl. B26d** *1/24, 7/06*

**U.S. Cl. 83—449** **12 Claims**



An apparatus for slitting sheets of material comprising a frame having an inclined flat stationary feed bed which is fixedly mounted on the frame. The bed includes a series of transversely spaced inclined rails and each rail is provided with a knife opening located intermediately relative to upper and lower ends of each rail. Cutting means are also supported on the frame and comprise a paired knife and anvil with each pair co-acting at each knife opening thereby providing a series of transversely spaced slitting stations for slitting a sheet as it moves downwardly along the inclined flat feed bed on the aforesaid rails. The lower ends of the rails extend beneath and below the slitting stations to support the sheet before and after slitting. Each paired knife and anvil are so constructed to shear cut the sheet and the knives are self-sharpening because of the manner in which they are mounted relative to the anvils. Product support guides are positioned between the inclined rails for supporting the contents contained within the "-blisters." A first sheet is employed carrying the blisters. The blisters in effect comprise a series of transparent open-ended pouches which are adapted to receive product and a closure sheet is secured to the first sheet to seal the product within the blister. The guides are used where the products being packaged are relatively heavy in weight.

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**3,788,181**

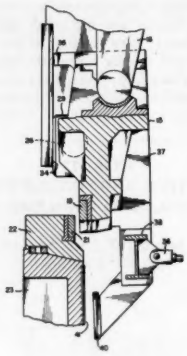
**SHEAR**

**James R. Adair, Pittsburgh, Pa., assignor to Wean United, Inc., Pittsburgh, Pa.**

**Filed Jan. 22, 1971, Ser. No. 108,843**

**Int. Cl. B26d** *5/08, 5/16*

**U.S. Cl. 83—554** **10 Claims**



The disclosure of this invention relates to a shear for side trimming or dividing steel plates produced by a rolling mill. It illustrates and describes a stationary lower knife head to which there is secured a lower knife and a vertically movable upper knife head that support an upper knife. The upper knife head is connected to a crank shaft by pitmans and through which means the upper knife is moved towards and away from the lower knife to effect a cut. The path of the shearing and return stroke of the upper knife head is controlled so that during the cutting portion of the shearing stroke, the upper knife is caused to move perpendicular to the plate over the entire range of plate thicknesses adapted to be sheared, and immediately thereafter, at the commencement of the return stroke, the upper knife is displaced away from the sheared edge of the plate. This control is achieved by providing a pair of trunnions pivotally connected to the upper knife head in which the upper knife head is urged against a knife action control guiding surface during the shearing stroke and displaced laterally immediately after shearing and during the first portion of its return stroke in a manner that the lower portion of the head is tilted away from the sheared edge of the plate. A piston cylinder assembly connected to the upper knife head is employed to assist in the positioning of the head in timed sequence with the rotation of the crank.

3,788,182

## CUTTING TOOLS WITH ROUND FACE TOOTH INSERTS

Robert P. Tyler, Westminister, Mass., assignor to Wallace-Murray Corporation, Fitchburgh, Mass.

Filed Sept. 7, 1972, Ser. No. 286,956
Int. Cl. B27b *33/02*; B27g *13/08*
U.S. Cl. 83—835 5 Claims

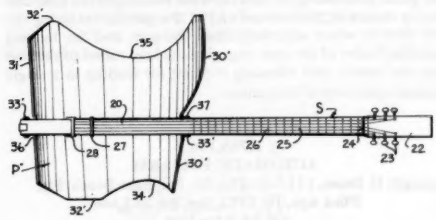
Saws have teeth inserts which present on each tooth a circular cutting edge resulting from truncating spheres of hard or hardenable material to form round surfaces facing the direction of sawing motion and presenting round cutting edges at the teeth tips having a positive or negative rake as desired.

3,788,183

## STRINGED INSTRUMENT WITH A SOUNDING PLATE

Ralph E. Mariner, 2060 S. Patton Ct., Denver, Colo.

Filed Feb. 5, 1973, Ser. No. 329,682
Int. Cl. G10d *3/00*
U.S. Cl. 84—291 10 Claims



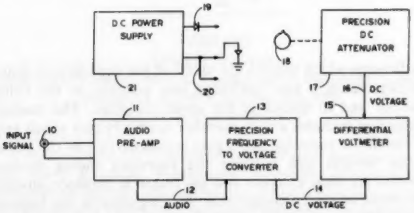

A stringed instrument having the strings carried on an extended stick, and a sounding plate affixed to the stick to amplify the vibrations of the strings. The sounding plate is a thin sheet of resilient material which is flexed when mounted upon the stick to impose bending stresses upon the plate.

3,788,184

## PRECISION ELECTRONIC TUNING DEVICE

Donald K. Zeiser, 7425 Parkdale, Clayton, Mo.

Filed June 29, 1972, Ser. No. 267,648
Int. Cl. G10g *7/02*
U.S. Cl. 84—454 21 Claims



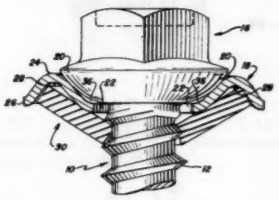

A precision electronic tuning device for tuning a musical instrument, having an audio pre-amplifier, a frequency to voltage converter, a D.C. attenuator and a differential voltmeter, the differential voltmeter connected between the outputs of the D.C. attenuator and the frequency to voltage converter as a null indicator to indicate the voltage difference between the two. The audio pre-amplifier amplifies the signal from the musical instrument and its output is connected to the input of the frequency to voltage converter. The frequency to voltage converter changes the amplified frequency to voltage proportionally.

3,788,185

## CONTROLLED-DRIVE SEALING FASTENER

Charles E. Gutshall, Schaumburg, Ill., assignor to Elco Industries, Inc., Rockford, Ill.

Filed Feb. 1, 1972, Ser. No. 222,576
Int. Cl. F16b *43/00*
U.S. Cl. 85—1 JP 14 Claims



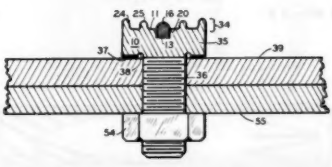

This controlled-drive fastener which seals the aperture through which it is driven comprises an elongated shank having an entering end portion at one extremity, a head of expanded cross section integral with the shank adjacent the other extremity, a centrally-apertured, substantially-rigid backing member or washer assembled on the shank adjacent the head and a centrally-apertured, substantially-resilient sealing member or washer assembled on the shank adjacent the substantially-rigid washer. The substantially-rigid washer has an annular convex portion intermediate the radial peripheries and disposed generally towards the head and a complementary annular concave portion disposed generally towards the entering end portion. The substantially-resilient washer is dilated adjacent the inner periphery to accommodate the fastener shank and to impart an inverted frustoconical configuration to the washer. Specific embodiments include self-centering designs, bonded assemblies, and swiveling assemblies.

3,788,186

## STRESS INDICATION

Nelson A. Crites, Columbus, Ohio, assignor to Battelle Memorial Institute, Columbia, Ohio

Filed Nov. 19, 1971, Ser. No. 200,321
Int. Cl. F16b *31/02*
U.S. Cl. 85—62 17 Claims




A member having a region that may be subject to compressive stress and means in the region for indicating that a predetermined magnitude of such stress has been encountered.

A cavity extending inward from a surface has a piece of brittle material fitted snugly in it against, and protruding beyond, the rim of the cavity. The predetermined stress causes the piece to shear and break apart at the rim.

In a bolt, the cavity may be in the outer portion of the head, where the compression is responsive to tension in the shank. Or the cavity may be in the convex portion of a Belleville washer, to provide a measure of tension in the shank of a bolt that is tightened against it.

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**3,788,187**

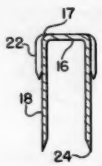
**STAPLING SYSTEM AND METHOD**

**Friedrich Karl Knohl, Roselle, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.**

**Filed Sept. 9, 1971, Ser. No. 178,956**

**Int. Cl. F16b** *15/00*

**U.S. Cl. 85—49** **10 Claims**




An attachment system in which a staple and staple diverging means cooperate in such a manner as to flare the penetrating legs of the staple as it enters a workpiece such as gypsum board. The diverging means is first placed in or on the workpiece and thereafter a staple, including a head portion and leg portion, is driven over the diverging means to diverge outwardly the legs of the staple and thereby provide substantial resistance to withdrawal of the staple, and additionally preventing the entering points of the staple from penetrating thru and protruding thru the opposite side of the workpiece.

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**3,788,188**

**COMBINATION MUZZLE-LOADING MORTAR BARREL AND PROJECTILE**

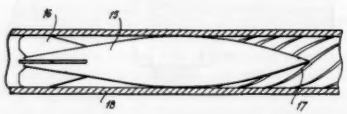
**Arno Sten Donner, P.O. Box 10032, Helsinki, Finland**

**Continuation of Ser. No. 801,712, Feb. 24, 1969, abandoned. This application Dec. 1, 1970, Ser. No. 94,194**

**Claims priority, application France, Apr. 27, 1967, 67104372**

**Int. Cl. F41j** *1/06*

**U.S. Cl. 89—1 F** **1 Claim**




A combination of muzzle-loading mortar barrel and projectile characterized in that at least one of said elements has on its side face, disposed opposite that of the other element, projections adapted to come into sliding contact with said other element and to form with it passages for the escape of air during the loading of said projectile in the barrel.

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**3,788,189**

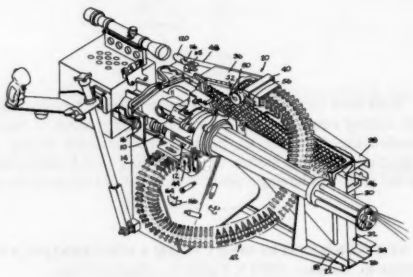
**AMMUNITION FEEDING SYSTEM**

**Harold G. Sachleben, Sr., Camden, N.J., and Robert Pettinga, Shelburne, Vt., assignors to General Electric Company**

**Filed July 12, 1972, Ser. No. 270,991**

**Int. Cl. F41d** *9/06*

**U.S. Cl. 89—34** **8 Claims**



An ammunition handling system has a housing for storing the main quantity of a belt of rounds of ammunition and a flexible guide for leading the belt from the housing to the gun, and having means at the forward end of the gun for retaining the belt therein when separated from the gun, and for locking onto the feeder of the gun, engaging the lead round of the belt into the feeder, and releasing the belt for feeding in a single manual operation of the gunner.

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**3,788,190**

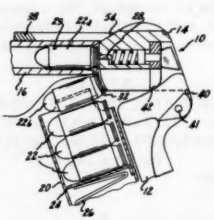
**AUTOMATIC FIREARM**

**Kenneth H. Dunn, 111 N.E. 27th St., Pompano Beach, Fla.**

**Filed Apr. 10, 1972, Ser. No. 242,346**

**Int. Cl. F41c** *5/06*

**U.S. Cl. 89—196** **5 Claims**



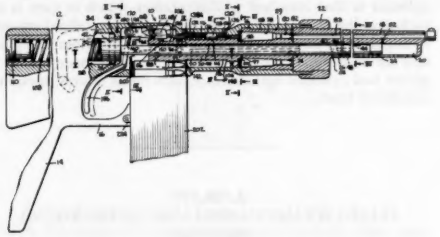
A firearm which utilizes the recoil of the explosion to automatically bring a new cartridge into position in the firing chamber and to discharge the spent cartridge. The loading mechanism includes a slide member having fingers which grip the rim of the cartridge and a cam means carried by the frame of the firearm and utilizing the rearward sliding motion between the slide member and the frame to produce upward movement of the cartridge from the magazine to the loading area and to produce alignment of the cartridge with the firing chamber of the firearm so that upon forward return movement of the slide member the cartridge is positioned in the firing chamber ready for firing.

3,788,191

## BURST FIRING, SINGLE BARREL, ARMAMENT

Richard Stephen Rose, South Burlington, and Burton Parker Clark, St. George, both of Vt., assignors to General Electric Company

Filed Dec. 6, 1972, Ser. No. 312,763
Int. Cl. F41d 7/02
U.S. Cl. 89—155 9 Claims



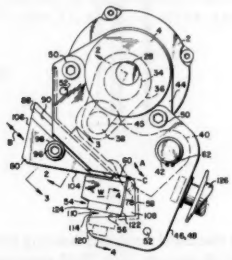
A single barrel rifle, has a plurality of chambers in a revolver drum which are loaded, chambered, extracted and ejected concurrently, and fired sequentially, under the control of a central actuation rod.

3,788,192

## METAL FORMING TOOL

Adrian H. Krieg, 2627 Dunning Dr., Yorktown, N.Y.

Filed Nov. 1, 1971, Ser. No. 194,284
Int. Cl. B23d 3/04
U.S. Cl. 90—40 15 Claims



A tool for preparing beveled edges on metal workpieces having workpiece holding means and a cutting element. The cutting element being mounted in a carrier pivotally movable in an arc to form a curved bevel in the workpiece.

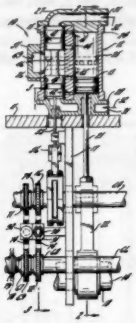
3,788,193

## STEAM ENGINE

Chadwell O'Connor, 3490 E. Foothill Blvd., Pasadena, Calif.

Filed Oct. 4, 1971, Ser. No. 186,069
Int. Cl. F01l 21/02, 31/14
U.S. Cl. 91—243 4 Claims

A steam engine of a modified uniflow type having a valve and valve actuating mechanism permitting double-acting cylinders to operate efficiently under high speed-low torque conditions and also to be smoothly adjusted, during engine operation, for lower compression-higher torque operation at low start-up speeds. A chain driven, double cam, valve actuating mechanism permits smooth variations in the timing of valve operation with a simple control system so that even unskilled operators can run the engine, without roughness,



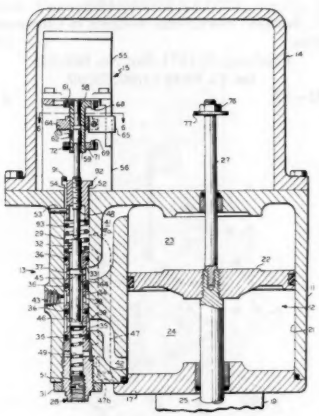
through its full speed and torque ranges. A novel cylinder design obtains what is substantially uniflow operation without undesirable high compression.

3,788,194

## ACTUATOR UNIT

Louis G. Burns, Watertown, N.Y., assignor to General Signal Corporation, Watertown, N.Y.

Filed June 30, 1972, Ser. No. 268,013
Int. Cl. F15b 13/16
U.S. Cl. 91—386 9 Claims



The disclosure concerns a unitized, proportional, electro-pneumatic linear actuator having a pneumatic power motor controlled by a position balanced servo valve which is actuated directly by an electrical stepper motor. Preferably, the position feedback linkage interconnecting the power motor and the valve comprises a pivoted lever system including springs for eliminating backlash, and a gain adjustment.

3,788,195

## CONTROL VALVE ASSEMBLY FOR A PNEUMATICALLY OPERATED STAPLER

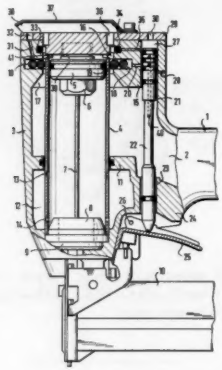
Wilfried Lange, Altenhagen, Germany, assignor to Bukama GmbH, Hannover, Germany

Filed Sept. 5, 1972, Ser. No. 286,335

Claims priority, application Germany, Sept. 10, 1971, P 21 45 302.1

Int. Cl. F15b *11/08, 13/042*

U.S. Cl. 91—457 10 Claims



An annular chamber of the control valve of a pneumatically operated stapler communicates with a compressed air admission channel and contains an elastic O-ring which is deformable in a radial direction. The outer edge of this O-ring constitutes a control pressure zone which can be affected by an auxiliary valve, and the interior edge of said O-ring is a sealing element for the air admission channel.

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3,788,196

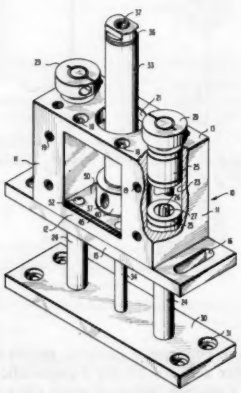
## LINEAR THRUSTER

William C. Sandlin, Waco, Tex., assignor to Ultramation Inc., Waco, Tex.

Filed Aug. 9, 1971, Ser. No. 169,933

Int. Cl. F01b *15/00, 29/00*

U.S. Cl. 92—13 21 Claims



A linear thruster comprising a housing supporting a power cylinder and piston, a thrust plate operated by said power cylinder and a pair of precision guide shafts slidably mounted in parallel bearings in the housing and attached to the thrust plate. The guide shafts insure that the thrust plate is moved very accurately in the desired direction. The guide shafts also resist torsional, lateral and tilting loads placed on the thrust plate. The cylinder is secured in an opening in the center of a rubberized fabric retainer. The retainer is then sandwiched between a mounting surface on the housing and a spring plate, each of which has an opening of radius slightly larger than the radius of the cylinder, through which the cylinder extends. The spring plate and retainer are fastened to the housing. The cylinder is thus attached to the retainer which in turn is attached to the housing. This allows the cylinder a slight amount of angular and axial movement, limited by the mounting plate and the housing, to provide compensation for inaccuracies in piston and cylinder manufacture, as well as lateral, torsional and shock loads.

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3,788,197

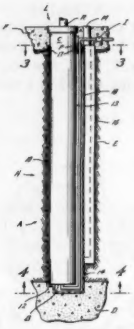
## FLUID LIFT MECHANISM AND UNDERGROUND HOUSING

Billy H. Bishop, 1111 S. Post Oak, Houston, Tex.

Filed Aug. 31, 1971, Ser. No. 176,480

Int. Cl. F01b *29/00*

U.S. Cl. 92—77 8 Claims



A pre-molded electrical insulating housing for receiving an underground metal portion of a fluid operated expansible chamber lift mechanism to protect the mechanism from corrosion. The housing includes means for protecting the associated piping effecting operation of the lift mechanism and the lift movement guiding assembly.

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3,788,198

## FLUID SUPPORTED RECTANGULAR SLIDE UNIT

John M. Check, Chelsea, and Donald R. Brettrager, Chesaning, both of Mich., assignors to Raycon Corporation, Ann Arbor, Mich.

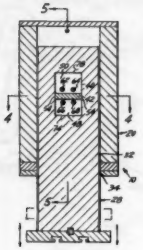
Filed June 2, 1972, Ser. No. 259,019

Int. Cl. F01b *15/02, 31/00*

U.S. Cl. 92—86 3 Claims

A fluid supported rectangular slide unit in which a rectangular cylinder member is telescoped in a rectangular housing member, and fluid under pressure is introduced to produce relative reciprocal movement of the members. The pressure fluid is also utilized to form a layer of fluid between the mem-

bers which promotes accurate relative positions of the members and facilitates relative movement. Such a slide unit is



suitable for accurately positioning a machine tool where rotational displacement between the tool and a workpiece cannot be tolerated.

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**3,788,199**

**METHOD FOR MANUFACTURING HEAVY DUTY BAGS**

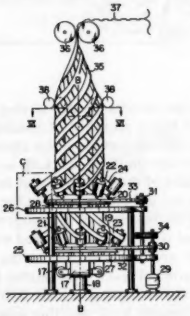
**Wasuke Sato, Kawasaki; Fumio Iriko, Tokyo; Sadao Yamamoto, Kawasaki; Mitsumaro Fujisawa, and Shigeyuki Hatakeyama, both of Yokohama, all of Japan, assignors to Showa Denko K.K., Tokyo, Japan**

**Division of Ser. No. 847,647, Aug. 5, 1969, Pat. No. 3,570,749. This application Nov. 10, 1970, Ser. No. 88,381**

**Claims priority, application Japan, Aug. 9, 1968, 43-56113; Dec. 20, 1968, 43-11079; Dec. 20, 1968, 43-11079; Apr. 11, 1969, 44-32513; Apr. 11, 1969, 44-32514; Apr. 11, 1969, 44-32515**

**Int. Cl. B31c** *1/00*

**U.S. Cl. 93—80** **3 Claims**



A method for manufacturing heavy duty bags wherein stretched tapes made of synthetic resin such as high density polyethylene or polypropylene are spirally wound in opposite directions in a manner to intersect each other to form a plurality of superposed cylindrical bodies. The superposed portions of the intersecting stretched tapes forming said cylindrical bodies are bonded together to form a cylindrical network, one end of which is sealed to provide a bottom.

**3,788,200**

**EXPOSURE DEVICE FOR MANUFACTURING COLOUR PICTURE TUBES**

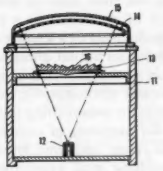
**Eiich Yamazaki, Ichihara; Koichi Maruyama, and Toshio Ueda, both of Mobara, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Mar. 2, 1972, Ser. No. 231,313**

**Claims priority, application Japan, Mar. 5, 1971, 46/11274**

**Int. Cl. G03b** *27/16*

**U.S. Cl. 95—1** **7 Claims**



In an exposure device for manufacturing a colour picture tube of the type comprising a source of light, and a correction lens having an effective surface divided into a plurality of discontinuous regions surrounded by boundary lines and disposed between the panel of the tube and the source of light whereby the photosensitive film coated on the inner surface of the panel is exposed to the light emanating from the source and transmitted through the correction lens to form a fluorescent screen, there is provided means for the correction lens for restricting the light transmitted through the discontinuous regions thereby uniformly exposing the photosensitive film.

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**3,788,201**

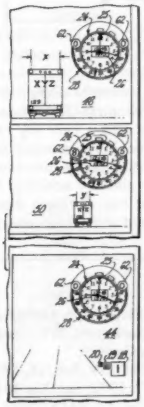
**METHOD FOR ESTABLISHING VEHICLE IDENTIFICATION, SPEED AND CONDITIONS OF VISIBILITY**

**Frank Abell, 954 W. Hyde Road Blvd., Inglewood, Calif.**

**Continuation-in-part of Ser. No. 793,461, Jan. 23, 1969, abandoned. This application Dec. 14, 1970, Ser. No. 97,588**

**Int. Cl. G03b** *17/24*

**U.S. Cl. 95—1.1** **4 Claims**



A method is provided for producing a photographic record showing the identification of a moving vehicle, its speed, conditions of visibility, date and time. Conditions of visibility are established by periodically making a first photographic record of a target at a selected location along a highway. In one em-

bodiment, identification and speed are established in a second photographic record by simultaneously photographing a vehicle moving along the highway in the vicinity of the target and a radar speed meter indicating the speed of the photographed vehicle. In a second embodiment, identification and speed are established by taking two pictures with the same photographic means of the identical portion of a moving vehicle in the vicinity of the target at a known time interval in order to make up a second photographic record, and measuring the relative sizes of the image of the identical portion of the vehicle in the two pictures; and thereafter calculating the speed of the vehicle by interrelating the time interval and vehicle image sizes with the image size of an object in a picture taken by said photographic means located at a known distance from the object, the object having an actual dimension corresponding to an actual dimension of the portion of the moving vehicle appearing in the second photographic record. The first and second embodiments for establishing identification and speed can be combined for purposes of corroborating the speed of the moving vehicle. Date and time are established by simultaneously photographing in all exposures making up the first and second photographic records date and time means showing the date and time at which the exposures are made.

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**3,788,202**

**VIEWFINDER FOR SINGLE LENS REFLEX CAMERAS**

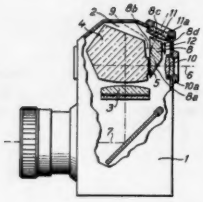
**Willi Wiessner, Wetzlar, Germany, assignor to Ernst Leitz GmbH, Wetzlar, Germany**

**Filed Aug. 22, 1972, Ser. No. 282,702**

**Claims priority, application Germany, Aug. 27, 1971, P 21 42 888.6**

**Int. Cl. G03b** *19/14*

**U.S. Cl. 95—11 V** **10 Claims**



A single lens reflex camera comprising a penta prism arranged above the reflex mirror is provided on the light emerging side of the prism with a light ray reflecting means. The reflecting means is movably mounted so that the light rays emerging from the prism may be directed into at least two different directions. It is thereby achieved that the camera may be used with at least two different viewing directions, e.g. mainly with a horizontal and with a vertical viewing direction.

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**3,788,203**

**JUSTIFICATION APPARATUS**

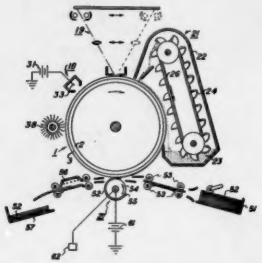
**Warren L. Rhodes, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Division of Ser. No. 115,299, Feb. 16, 1971. This application Oct. 27, 1972, Ser. No. 301,381**

**Int. Cl. B41b** *23/00*

**U.S. Cl. 95—4.5** **6 Claims**

A method for justifying a line of type from existing typographic material and a character generator is disclosed. An electrostatic charge pattern corresponding to at least a part of the image to be printed is formed. The image is developed and justification calculated. During the transferring process, the image-bearing member is selectively disengaged and re-engaged with the transfer member according to predetermined



values to obtain the effect of justifying the line. This process is applicable to generally any form of imaging involving a transferable image or character.

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**3,788,204**

**SWINGING-SECTOR CAMERA SHUTTER WITH WARNING INDICATOR**

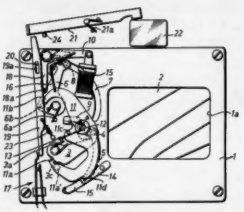
**Peter Loseries, Diez, Germany, and Toshio Hayashi, Osaka, Japan, assignors to Minolta Camera Co. Ltd., Osaka, Japan and Ernst Leitz GmbH, Wetzlar, Germany**

**Filed Mar. 30, 1973, Ser. No. 346,575**

**Claims priority, application Japan, Apr. 11, 1972, 47/36248**

**Int. Cl. G03b** *9/36*

**U.S. Cl. 95—55** **4 Claims**



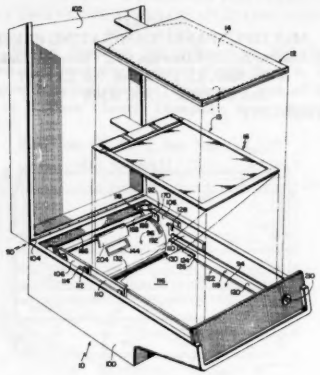
A swinging-sector camera shutter having a plurality of sectors. Each sector has a plurality of blades which execute a combined rotary-sliding motion. The shutter has a control lever which, when the shutter is cocked, successively engages the operating cranks of the first slide and the second slide and moves same. The second slide is held, in the initial position, by a pawl subjected to the force of a spring, which latter disengages the pawl and is hingedly connected with its other end to the control lever and is tensioned at the beginning of the operation of the control lever. The shutter has a holding magnet to which voltage is applied at least at the beginning of the operation of the control lever and this magnet holds the pawl in the locking position against the force of the spring until current is cut off by the timer control device. The shutter is provided additionally with a displaceable and pivotable warning lever, one end of which is held, by a pawl, in contact with the magnet by spring or magnetic force, outside of the range of motion of the operating crank of the first rotary slide. This warning lever is pulled into this range of motion by spring force and is shifted, by the operating crank into a viewing aperture when the pawl, during the operation of the control lever, is lifted off the magnet before the operating crank has reached its final position in the released position.

3,788,205

## PHOTOGRAPHIC APPARATUS AND SYSTEM FOR PROCESSING LARGE FORMAT, SELF-DEVELOPING FILM UNIT

John F. Pasieka, Acton, and Duncan C. Sorli, Chelmsford, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed May 12, 1972, Ser. No. 252,566
Int. Cl. G03d 5/02
U.S. Cl. 95—93 48 Claims



A compact drum processor for use in conjunction with a specially configured, large format, self-developing, film unit and film holding cassette to form a system for distributing a fluid processing composition between and in contact with preselected portions of two superposed elements forming the large format film unit.

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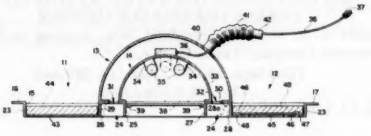
3,788,206

## MODULAR CEILING CONSTRUCTION

Gerard Edmund Mulvey, 36 Castle Frank Rd., Toronto, Ontario, Canada

Filed Aug. 21, 1972, Ser. No. 282,247
Int. Cl. F21s 1/02
U.S. Cl. 98—40 DL 9 Claims



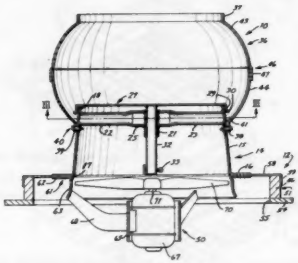
A modular construction unit for ceiling construction and having a unitary frame, ceiling fabric means supported by and incorporated in the frame, suspension attachment means defined by the frame, lighting fixture means attached to the frame and adapted to be supported thereby in position in the ceiling, and air handling means attached to said frame and adapted to be supported thereby when in position in the ceiling and electrical connection means and air handling connection means associated with the lighting fixture means and the air handling means for connection to services within the ceiling, and junction means formed on said frame means around the edges thereof for interfitting engagement with adjacent said units to form a complete ceiling.

3,788,207

## TOP DISCHARGE ROOF VENTILATOR

Lewis S. Doherty, II, Parish of East Baton Rouge, La., assignor to Doherty-Silentaire, Baton Rouge, La.

Filed May 26, 1972, Ser. No. 257,148
Int. Cl. F04d 25/14
U.S. Cl. 98—42 12 Claims



A roof ventilator for exhausting air includes a tapered, upstanding, hollow stack for sealed securement on a roof at an air opening therein. A hollow, upstanding and semispherical outlet bell is telescoped in close spaced radial relation over the upper end of the stack and has an open upper end. A substantially flat damper pan normally rests upon and closes the upper stack end. A mounting sleeve is fixedly supported within the stack. A hollow guide element, pendently and coaxially fixed to the damper pan, is slidably located within the mounting sleeve and carries limiting means coacting with the mounting sleeve for limiting movement of the damper pan upwardly off the upper stack end, whereby a pressure drop from the stack to the bell causes the damper pan to lift from the upper end of the stack to vent the stack into the bell.

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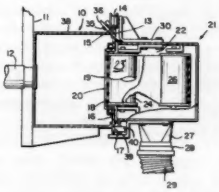
3,788,208

## SPRING SECUREMENT MEANS FOR SEALING WEB

Billy M. Brumett, Indianapolis, Ind., assignor to Hawley Manufacturing Corporation, Indianapolis, Ind.

Filed Dec. 7, 1972, Ser. No. 313,183
Int. Cl. F23j 11/00
U.S. Cl. 98—115 VM 7 Claims



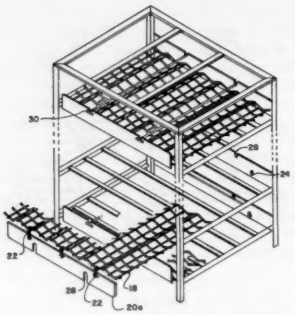
Bowed-spring means for releasably retaining the sealing web to the apertured header wall in a "TRAV-L-VENT" type of ventilating system.

3,788,209

## SMOKEHOUSE RACK

Orhan G. Artar, Evanston, Ill., and Charles W. Ross, Pittsburgh, Pa., assignors to Armour and Company, Chicago, Ill.

Filed Mar. 11, 1970, Ser. No. 18,417
Int. Cl. A47j *43/00*
U.S. Cl. 99—349 8 Claims



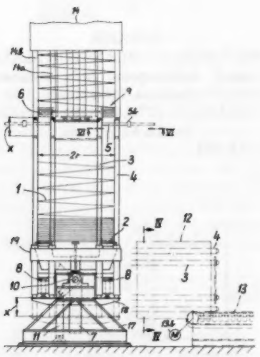
A smokehouse rack providing restrainers to compress the ends of sausages as they are smoked or cooked to reduce tapered ends and provide more uniform slices.

3,788,210

## APPARATUS FOR FORMING PACKAGED COILS OF WIRE

Heinz Lingemann, Homberg, Germany, assignor to Fried Krupp Gesellschaft mit Beschrankter Haftung, Essen, Germany

Filed Oct. 24, 1972, Ser. No. 300,341
Claims priority, application Germany, Oct. 23, 1971, 2152953
Int. Cl. B65b *13/02*
U.S. Cl. 100—7 10 Claims



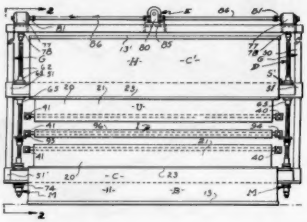
Two sets of parallel guide bars define with a displaceable lower platform a cylindrically annular spaced which can be tilted from a vertical to a horizontal position. A platform above the lower platform can be brought into position to close the end of the space when the space is vertical. Wire supplied continuously from above as a helix collects either on the lower platform in the space or, if the upper platform is in place on the upper platform. In operation a predetermined quantity of wire collects in the space, whereupon the upper platform is brought into place and the predetermined quantity is severed. The lower platform is then lifted to compress this quantity of wire against the underside of the upper platform and devices known per se are employed to tie up the so formed package. The guides and the lower platform are then lowered somewhat and then swung into a horizontal position whereupon the package is pushed out by the lower platform onto a waiting conveyor. The assembly is then swung back into the vertical position and the upper platform moved aside for formation of another package.

3,788,211

## MULTIPLE PANEL LAMINATING PRESS

Wylie A. Mason, Jr., 354 Dawson Dr., Thousand Oaks, Calif.

Filed Mar. 23, 1972, Ser. No. 237,267
Int. Cl. B02c *11/08*; B30b *15/34*
U.S. Cl. 100—93 P 13 Claims



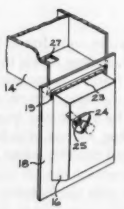
A building panel laminating press including a base comprising a concrete filled case and carrying a fabricated platen with a flat top surface and vertical columns about its perimeter, a weighted head comprising a concrete filled case and carrying a fabricated platen with a flat bottom surface and slidably coupled with the columns, power driven jack means to shift the head vertically relative to the base and one or more intermediate fabricated platens with flat top and bottom surfaces in vertical spaced relationship between the head and base and supported for limited yieldingly vertical movement; each platen having tubes therein to conduct a heated fluid medium therethrough; and vertically extensible shiftable heat insulated shielding means about and between each adjacent pair of platens and having sides adapted to be manually shifted to open positions to provide access to between the platens.

3,788,212

## REFUSE COMPACTOR HAVING A PIVOTALLY ARRANGED RAM FACE MEMBER

Donald G. H. Doepke, Greenfield, Wis., assignor to General Electric Company, Louisville, Ky.

Filed Sept. 18, 1972, Ser. No. 289,645
Int. Cl. B30b *15/06*
U.S. Cl. 100—229 A 5 Claims



A household refuse compactor of the type having a receptacle wherein refuse is compacted by a movable ram body

member. The ram body member has a ram face member normally carried in firm attachment thereto for compressing refuse in the receptacle. The ram face member is adapted to be manually released from its normal compressing position on the ram body member and swung to a more accessible position to enable removal of soil therefrom.

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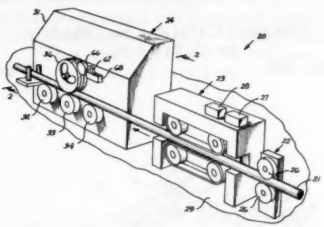
3,788,213

## METHODS OF AND APPARATUS FOR MARKING SUCCESSIVE SECTIONS OF AN ELONGATED MATERIAL

**William B. Brown, deceased, late of Pasadena, Md. (by Hazel V. Brown, representative); George Frank Besnyo, Towson, and Eugene Marshall Hornor, Baltimore, both of Md., assignors to Western Electric Company, Incorporated, New York, N.Y.**

**Filed Jan. 17, 1972, Ser. No. 218,327**
**Int. Cl. B41f** *17/10*
**U.S. Cl. 101—37** **24 Claims**



A first code printing head is removably attached to one end of an arm of a turret mounted rotatably at the center thereof within a drum mounted on a constantly rotating drum shaft having successive portions of the circumferential surface thereof moved adjacent a path of travel of successive suctions of a jacketed cable transverse of and spaced from the drum axis. When the first head is oriented radially of the drum, the head marks a code on the successive sections of the cable being advanced in engagement therewith. The other end of the arm is adapted to support a second code printer head so that as the first head is moved out of the radial or printing position, the second head is moved into the radial position where the second code printer marks a different code on a subsequent cable having a different construction.

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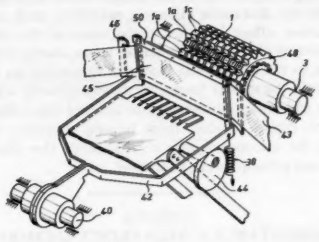
3,788,214

## PRINTING APPARATUS FOR BUSINESS MACHINES

**Dieter Folkens, and Rolf Moritz, both of Wilhelmshaven, Germany, assignors to Olympia Werke AG, Wilhelmshaven, Germany**

**Filed May 10, 1972, Ser. No. 252,015**
**Claims priority, application Germany, May 19, 1971, P 21 24 889.5**
**Int. Cl. B41j** *27/00*
**U.S. Cl. 101—96** **9 Claims**

A printing apparatus for typewriters, calculators, and like business machines in which the resilient prongs of a comb shaped printing plate are operated to slide in frictional contact in slightly resiliently deformed condition over areas of pressure responsive sheets covering printing type faces so that imprints are made. The sheet means may include an ink ribbon, a paper sheet, and a stationary foil on which the resilient prongs



slide while holding the ink ribbon on the papers sheet, and the paper sheet on the type face, or other pressure responsive imprint forming sheets may be used.

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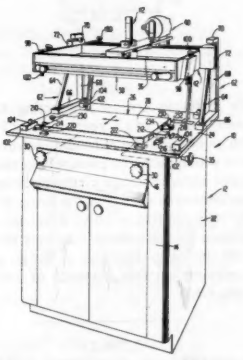
3,788,215

## PRINTER WITH SCREEN FRAME LIFT AND SQUEEGEE SUPPORT PIVOT MEANS

**Daryl Gene Lambert, Williamsport, Pa., assignor to The Dia-Print Company, Inc., Williamsport, Pa.**

**Filed Jan. 4, 1971, Ser. No. 103,457**
**Int. Cl. B41l** *13/00*
**U.S. Cl. 101—123** **7 Claims**



The master frame which supports a transversely movable squeegee assembly and a removable screen chase is coupled by blocks including slide bearings to a rearwardly upwardly inclined shafts forming one member of each support assembly fixed to opposite sides of the table top of the screen printer cabinet. This allows the master frame to be raised and lowered and simultaneously moved rearwardly to permit easy visual inspection of the platen supporting the screen print substrate. The squeegee assembly is supported for movement by yoke members carrying open sided ball bushings at 90° to each other, which in turn slidably receive a pair of mounting shafts fixed to a rack bar in cantilever fashion. The rack bar, being pivoted at its ends, pivots the squeegee assembly about a horizontal axis extending parallel to the front panel of the screen printer. A drive motor fixed to the squeegee assembly mounting plate rotates a drive pinion in mesh with the rack on a side of the bar opposite to that of the horizontal ball bushing. Paired, angled male locator members are inclined 60° to the horizontal, in the same manner as the guide shafts of the support assemboy for the blocks, to accurately locate the master frame relative to female locator members fixed to the top of the cabinet table. A single lifting cylinder centrally located

relative to the end bars of the master frame and the support assemblies effects equal force application to both sides of the master frame maintaining horizontal alignment between the same during complete lift of the master frame from the underlying table top. Rotatable clamping members, each carrying a torque screw, effect identical registration of the removable screen printing chase with the master frame during coupling of the chase to the frame. The platen is supported on the table top, beneath the master frame, by means allowing adjustment both fore and aft and to the right or left and dial indicators indicate the extent of shift from neutral positions in either direction for insuring proper relocation of the platen after removal and subsequent replacement.

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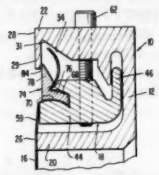
**3,788,216**

**ADJUSTABLE SCREEN PRINTING CHASE**

**Daryl G. Lambert, Phoenix, Ariz., assignor to The Dia-Print Company, Inc., Phoenix, Ariz.**

**Filed Dec. 8, 1971, Ser. No. 205,944**
**Int. Cl. B41n** *1/24*
**U.S. Cl. 101—127.1** **9 Claims**



A laterally shiftable screen supporting bar within a U-shaped channel member of a screen printing frame assembly is provided with an arcuate slot extending inwardly from the surface of the bar which faces the channel opening and receives a similarly shaped arcuate screen clamping strip with the screen edge held therebetween such that the force acting through the screen on the strip tending to move it linearly out of the arcuate slot is resisted by the arcuate interlock formed thereby. A projection on the strip engages a flange on the channel member to prevent arcuate removal of the strip from the channel member slot.

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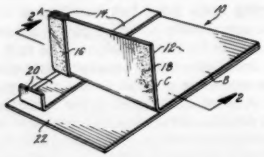
**3,788,217**

**REINFORCED STENCIL ASSEMBLY WITH FOLDABLE, ADHESIVE COVERING GUARDIAN STRIP**

**Harold H. Rabelow, Marion, Ill., assignor to Marsh Stencil Machine Company, Belleville, Ill.**

**Filed May 27, 1971, Ser. No. 147,395**
**Int. Cl. B41n** *1/24*
**U.S. Cl. 101—128.1** **12 Claims**



There is disclosed a novel stencil assembly employed in duplicating address and other information on cartons, packages, and the like. The assembly includes a stencil tissue or sheet, on one side of which is permanently secured a narrow ridigizing strip adjacent the top edge of the stencil tissue. A strip of pressure sensitive reusable adhesive is applied to the opposite side of the stencil tissue substantially coextensive with the narrow rigidizing strip. A carbon material covers the remainder of the opposite side of the stencil sheet. A narrow guardian strip engages the lower portion of the adhesive strip. A backing sheet removably engages the remaining upper portion of the adhesive strip. A modified structure includes a carbon sheet in lieu of the carbon on the back of the stencil sheet and the guardian strip, said carbon sheet having a perforation line facilitating tearing off of a substantial portion thereof to provide a guardian strip. The guardian strip and the retained carbon sheet segment are foldable over to cover the exposed adhesive strip bared by removal of the backing sheet.

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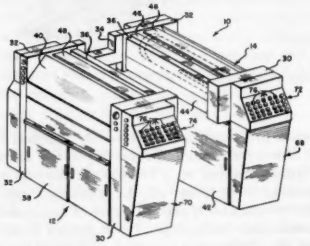
**3,788,218**

**WALK-IN ROTARY PRINTING MACHINE UNIT**

**Ralph L. Fusco, Commack, and Robert A. White, Plainview, both of N.Y., assignors to Wood Industries, Inc., Plainfield, N.J.**

**Filed Oct. 14, 1971, Ser. No. 189,140**
**Int. Cl. B41f** *5/06*
**U.S. Cl. 101—180** **2 Claims**



An improved perfecting unit of a rotary web printing machine having at least two printing couples where in the printing couples are separated such that they are in spaced apart relation with each other and including modular prewired housing sections, guards and shields for each couple thereby providing a configuration having a walk-in space which facilitates improved installation, operation, repair and maintenance.

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**3,788,219**

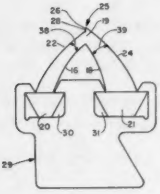
**BLADE FOR SCRAPING LIQUIDS FROM A RELATIVELY MOVING SURFACE**

**John P. Gallagher, Park Ridge, Ill., assignor to A. B. Dick Company, Chicago, Ill.**

**Filed Apr. 4, 1972, Ser. No. 241,003**
**Int. Cl. B41f** *35/04*
**U.S. Cl. 101—425** **5 Claims**

This invention relates to a scraper blade assembly adapted to scrape liquids from a relatively moving surface, the blade

having a triangular cross section including respective front and rear legs joined at an apex to form a scraping ledge, and each of the legs having their respective opposite ends anchored in a support bar adapted to move the scraping ledge toward and away from the relatively moving surface.



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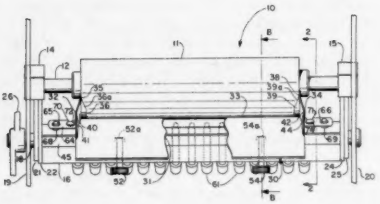
**3,788,220**

## INK FOUNTAIN TROUGH WITH SEALS FOR FOUNTAIN ROLLER

**Wallace J. Laben, Chicago, and Kenneth J. Tonkin, Glenview, both of Ill., assignors to A. B. Dick Company, Chicago, Ill.**

**Filed Apr. 4, 1972, Ser. No. 241,023**
**Int. Cl. B41f** *31/02*
**U.S. Cl. 101—363** **5 Claims**



The present invention relates to a replaceable and disposable ink fountain which can be manufactured of thermoplastic material, for example, and which is constructed as a one-piece item having edge and peripheral seals to engage an ink fountain roller in a sealing manner, and also a blade edge adjustable relative to the ink fountain roller to meter application of ink to the roller.

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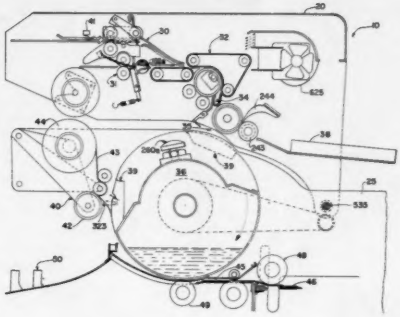
**3,788,221**

## STENCIL DUPLICATOR WITH MASTER MAKING AND PNEUMATIC HANDLING FEATURES

**Lawrence A. Borneman, Lombard, Ill., assignor to A.B. Dick Company, Chicago, Ill.**

**Filed Dec. 15, 1970, Ser. No. 98,260**
**Int. Cl. B41l** *13/06*
**U.S. Cl. 101—116** **17 Claims**

An improved reproduction system for making duplicates from an original having a printing cylinder provided with a clamp for selectively receiving, holding or ejecting a master, a take-up assembly adapted to cooperate with an eject mode of cylinder clamp operation to receive a discharged master, an original and master material feeding assembly adapted to bring the original and master into registry and carry the sandwiched original and master material into an imaging assembly to make a duplicating master, a transfer assembly adapted to transfer the imaged master toward the cylinder clamp, and the latter operating in a receiving mode adapted to draw the master to the printing cylinder, and to hold the imaged master during a print mode of cylinder operation in which reproductions are made. The system has controls for programming the machine through respective preparation, function and print cycles.



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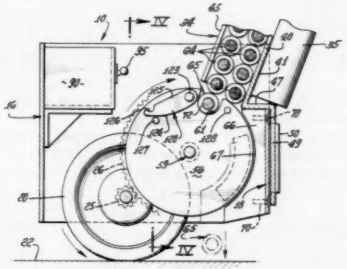
**3,788,222**

## FUSEE IGNITING DISPENSER

**Clarence F. Evans, 26801 Camargo Dr., Saugus, Calif.**

**Filed Dec. 4, 1972, Ser. No. 311,633**
**Int. Cl. C06d** *1/04*
**U.S. Cl. 102—37.4** **13 Claims**



A rollable cart with a telescoping handle to facilitate pushing by the user, and including a hopper for carrying a supply of fusees to be ignited, transport means operated in timed relation with rotation of the cart wheels for moving one fusee from the hopper so that its igniter end is forced into abutting contact with a heated member for igniting the fusee, and means for then dropping the ignited fusee onto the ground, as the cart is pushed therealong by the user. Disabling means are included to prevent the transporting, ignition and dispensing of fusees during rearward movement of the cart, as when being towed back to the starting point of fusee distribution. The handle and hopper form a unitary structure which is quickly and easily disassemblable from the cart proper, to facilitate packing in a small area such as in the trunk of a peace officer's automobile.

## 3,788,223
## EXPLOSIVE PRIMER

William Edward Schaefer, Hagerstown, Md., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

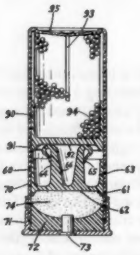
Filed July 13, 1972, Ser. No. 271,595
Int. Cl. F42b 3/10
U.S. Cl. 102—24 R 7 Claims

A priming device especially adapted for use in combination with a blasting cap to initiate relatively insensitive blasting agents in small-diameter boreholes comprising a cap-sensitive, flexible, self-supporting explosive charge; a thin-walled tubular member in fixed contact with the charge; and means for coaxially positioning a blasting cap in the tubular member so that the cap's base charge is in initiating relationship with the self-supporting explosive charge and both ends of the cap are protected from exposure, e.g., to potentially hazardous conditions. An assembly comprising the priming device and a blasting cap positioned therein, in which assembly the leg wires or fuse, which are adapted to connect the cap to an outside energy source, are secured to the tubular member so as to prevent the relative movement of cap and tubular member, and thereby maintain the initiating relationship between the cap's base charge and the self-supporting explosive charge.

## 3,788,224
## NESTED WAD COLUMN AND METHOD OF SHOT SHELL LOADING

Edward E. Merritt, Anoka, Minn., assignor to Federal Cartridge Corporation, Minneapolis, Minn.

Continuation of Ser. No. 637,578, May 10, 1967, abandoned, which is a continuation-in-part of Ser. No. 560,221, June 24, 1966, abandoned. This application Dec. 6, 1968, Ser. No. 785,017
Int. Cl. F42b 7/08
U.S. Cl. 102—42 C 20 Claims

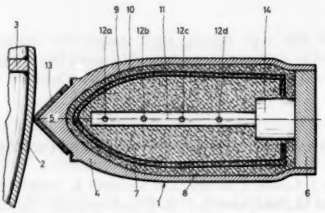


A wad column which is adjustable to an infinite variety of lengths, during loading of the shell, to accommodate any of several different loads. Also, a method of loading shot shells in which the effective height of an overpowder wad is varied, as the wad is seated, to accomodate a particular shot and powder charge combination within the shot shell case.

## 3,788,225
## WARHEAD, PARTICULARLY FOR FIGHTING SHIPS

Manfred Held, Kuhbach, Germany, assignor to Messerschmitt-Bolkow-Blohm Gesellschaft Mit Beschrankter Haftung, Munchen, Germany

Filed Oct. 20, 1971, Ser. No. 190,980
Claims priority, application Germany, Dec. 3, 1970, P 20 59 563.5
Int. Cl. F42b 13/04
U.S. Cl. 102—56 8 Claims

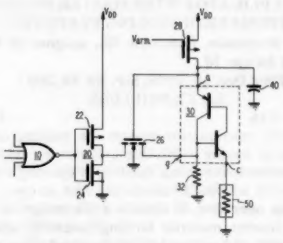


A warhead, particularly for fighting ships, has an explosive charge detonated, after a time interval, determined by a delay member, following activation of a release element, such as an impact contact or an inertial contact, by one or more priming elements located at a point ensuring optimum compression and/or fragmentation effects. This point preferably is the axis of a cylindrical cross-section explosive charge. At least two electrodes, of electrically conductive wire, nets, foil, or the like are installed in the warhead at a position where they are short circuited by combustion, deflagration, or detonation, the location being one other than the point at which the priming elements are installed, and preferably one spaced radially from the axis of the cylindrical cross-section explosive. The electrodes are so associated with the priming elements that, when the electrodes are short-circuited, the priming elements are energized substantially instantaneously and without delay.

## 3,788,226
## ELECTRONIC FIRING CIRCUIT

Richard Plumb Fillmore, Plainfield, and Robert Charles Heuner, Bound Brook, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed July 18, 1972, Ser. No. 272,956
Int. Cl. F42c 11/06, 11/00
U.S. Cl. 102—70.2 R 15 Claims



In an electronic firing circuit including a firing capacitor the charge on the firing capacitor is used as a control signal to isolate a firing thyristor from an erroneous triggering signal.

**3,788,227**

## JET IGNITION DEVICE FOR A PYROTECHNIC FUZE

**John R. Clifton, and Gary S. Edwards, both of Bedford, Ind., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Jan. 5, 1973, Ser. No. 321,435**
**Int. Cl. F42c** *19/08*
**U.S. Cl. 102—70 R** **1 Claim**

An ignition device having an open-ended case with a primer closing one end and a nozzle closing the opposite end. An orifice is provided in the nozzle and the orifice is closed by a frangible disk attached to the outer end of said nozzle. An ignition pellet is contained in said case adjacent said nozzle and detonation of said primer ruptures said frangible disk and ignites said ignition pellet.

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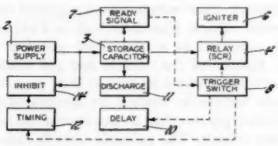
**3,788,228**

## FIRING CIRCUIT

**Robert J. Wilson, Bolingbrook, Ill., assignor to General Motors Corporation, Detroit, Mich.**

**Filed Mar. 27, 1972, Ser. No. 238,234**
**Int. Cl. F42c** *11/06, 15/40, 11/00*
**U.S. Cl. 102—70.2 R** **4 Claims**




A firing circuit for a charge such as a round of ammunition includes a voltage regulated power supply effective to raise the voltage from the supply voltage available in the vehicle, a storage capacitor charged by the power supply, and means for discharging the capacitor through the igniter of the charge. A circuit responsive to the charge level of the capacitor indicates when it is ready and enables operation of a trigger switch to effect the firing. After a short time delay, the capacitor is drained of any residual charges due to the opening of the firing circuit. Also, for a time after initiation of firing, a timing circuit closes a shunt which disables the supply of the current to the capacitor, preventing further charge during this timing interval.

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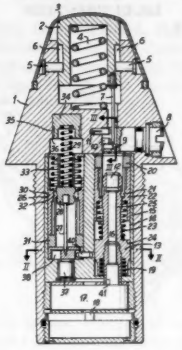
**3,788,229**

## FUSE FOR NON-GYRATORY MISSILES

**Robert Simmen, and Olivier Chabloz, both of Geneva, Switzerland, assignors to Mefina S.A., Fribourg, Switzerland**

**Filed Aug. 31, 1972, Ser. No. 285,123**
**Claims priority, application Switzerland, Sept. 10, 1971, 013289/71**
**Int. Cl. F42c** *9/00*
**U.S. Cl. 102—74** **5 Claims**

A fuse provided with two striker-and-detonator systems, one of which operates upon impact against a target and may be manually locked against operation and the other operates only with a predetermined lag after impact. The first system is adapted to be brought in all cases into a ready-for-operation condition at the moment of the firing of the missile, in which condition the member carrying the detonator of the first system is brought within reach of the corresponding striker while it simultaneously releases a safety interceptor extending between the striker and detonator of the system operating with a lag.



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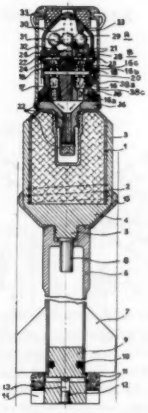
**3,788,230**

## UNIVERSAL PROJECTILE

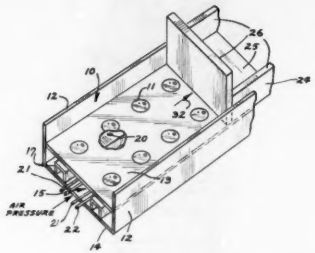
**Andre Losfeld, 13 and 13 rue Thiebault, 94 Charenton, France**

**Filed Jan. 22, 1970, Ser. No. 4,829**
**Claims priority, application France, Jan. 29, 1969, 6901738; Nov. 28, 1969, 6941116**
**Int. Cl. F42c** *9/14*
**U.S. Cl. 102—74** **11 Claims**



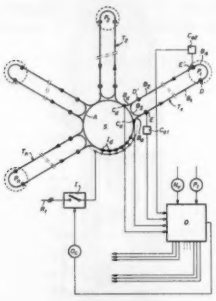
A universal projectile comprising a fuze, a body and a tail, wherein said body has at its upper part some means for removably fitting said fuze, and at its lower part some means for removably fitting said tail, and wherein said fuze has an autonomous impact system and an autonomous delay system.

3,788,231
VALVE FOR LEVITATED VEHICLE TRACK
Roger D. Bloomfield, Jackson, Wyo., assignor to Uniflo Systems Company, Edina, Minn.
Division of Ser. No. 37,691, May 15, 1970, Pat. No. 3,685,788.
This application May 8, 1972, Ser. No. 251,316
Int. Cl. B61b 13/08
U.S. Cl. 104—23 FS 9 Claims



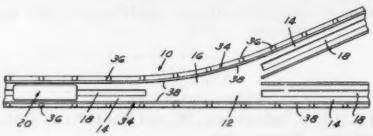

A pilot operated valve for use in combination with a track which supplies air for levitating a vehicle for movement along the track. The valve may be automatically actuated by pilot pressure built up underneath the vehicle, and is self-closing after the vehicle has passed. Pilot operation is provided to insure rapid and accurate operation, and also control pressure conduits can be provided for making the valve open in response to signals other than air pressure rise underneath a levitated vehicle.

3,788,232
TRANSPORT SYSTEM
Karl Schneider, Plan-les-Ouates/Geneve; Gerard Cuenoud, Grand-Lancy/Geneve; Gabriel Bouladon, Versoix/Geneve, and Paul Zuppiger, Athenaz/Geneve, all of Switzerland, assignors to Battells Memorial Institute, Carough, Geneva, Switzerland
Filed Apr. 17, 1972, Ser. No. 244,722
Claims priority, application Switzerland, Apr. 20, 1971, 5722/71
Int. Cl. B61g 3/00
U.S. Cl. 104—88 1 Claim



A transport system comprising a network of transport tracks and vehicles in the form of a U-shaped cabins movable on the transport track and into and from sunk positions on withdrawal and supply tracks located at a lower level than the transport track. The transport tracks are in the form of closed track loops with a recycling track section, a passenger entry station and a passenger exit station at each end of the track loop. At least one of the recycling track sections is connected through the vehicle withdrawal and supply tracks to a vehicle distribution and storage track. Each passenger entry station is provided with means for ascertaining the number of vehicles required by counting the number of arriving passengers and for feeding the corresponding data to a computer which accordingly transfers the required number of vehicles from the distribution and storage track to the transport tracks and controls the setting of shunting switches as required.

3,788,233
GUIDED TRANSPORTATION SYSTEM
Denny D. Colovas; John S. Logan, and Richard R. Skruch, all of Dearborn, Mich., assignors to Ford Motor Company, Dearborn, Mich.
Filed Aug. 5, 1971, Ser. No. 169,396
Int. Cl. B61j 3/00
U.S. Cl. 104—88 5 Claims

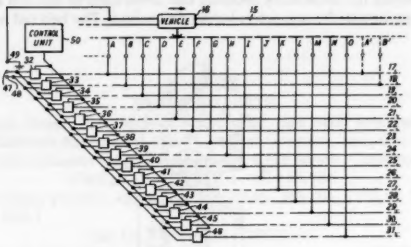


A guided transportation system is disclosed. This system comprises three basic elements. A first element is a substantially flat roadway. A second element is a guided vehicle which includes normal vehicle wheels as well as a plurality of aligning wheels mounted in a horizontal position in a space between the bottom of the vehicle and the roadway. These aligning wheels are located so that at least a portion of each wheel extends outwardly toward an associated side of the vehicle a distance greater than an associated one of the wheels supporting the vehicle. The guidable vehicle also includes at least a pair of switch wheels mounted for movement on opposite sides of the vehicle. These switch wheels are movable individually from a switching position to an inactive position. The third element of the system is a pair of sidewall assemblies which extend along the length of opposite edges of the roadway. Each of the sidewall assemblies includes a plurality of vertical supporting portions and an aligning wheel engageable surface mounted on the portions which functions to guide the vehicle along the roadway when contacted by the aligning wheels. Each sidewall assembly also has along at least the portions thereof associated with vehicle switches for the roadway, a switch wheel engageable surface which may be engaged by one of the switch wheels when in its switching position to guide the vehicle along a particular path through a switch.

3,788,234
VEHICLE-CONTROL APPARATUS
Thomas Oliver Jeffries, Uxbridge, England, assignor to Brunel University, Uxbridge, England
Filed Mar. 28, 1972, Ser. No. 242,877
Claims priority, application Great Britain, Mar. 30, 1971, 8,246/71
Int. Cl. B60l 15/04
U.S. Cl. 104—152 7 Claims

In a transport system the movement of vehicles is controlled by a control wave travelling along a vehicle track. The vehicle

has a pick-up device for picking up the travelling wave, and driving means responsive to the control wave and causing, or




tending to cause, the vehicle to move along the track in register with, and hence at the same speed as, a predetermined region of the wave.

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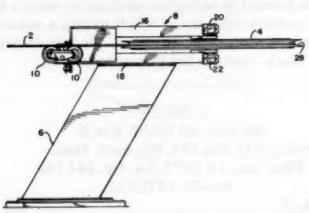
**3,788,235**
**SUPPORT STRUCTURE FOR TURN WHEEL OF CABLE-DRIVEN CHAIR LIFT**

**Donald D. Bintrim, Harmony, Pa., assignor to Berry Metal Company, Harmony, Pa.**

**Filed Oct. 31, 1972, Ser. No. 302,612**
**Int. Cl. B61b** *7/00*
**U.S. Cl. 104—191** **8 Claims**



An improved turn wheel support structure for cable-driven chair lift, wherein the support structure is provided with a safety device in the form of a pair of wheel retention plates each having a saddle portion for grasping and retaining the hub portion of the return wheel should the shaft for the wheel break, the design being such that the wheel will be urged by the cable into the saddle portions of the plates should a fracture of the shaft occur.

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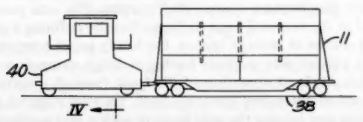
**3,788,236**
**COKE QUENCHING CAR**

**William D. Edgar, Allison Park; John D. Sustarsic, McKees Rocks, and Raymond C. Kinzler, Carnegie, all of Pa., assignors to Koppers Company, Inc., Pittsburgh, Pa.**

**Filed Dec. 27, 1971, Ser. No. 212,570**
**Int. Cl. B61d** *3/16, 7/08;* **C10b** *39/14*
**U.S. Cl. 105—254** **2 Claims**




A coke quenching car is provided with a plurality of transversely extending baffles that reduce the gap between the quenching car and the coke guide hood. The end walls and one side of the car, like the baffles extend above the top of the quenching car locomotive.

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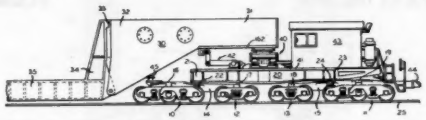
**3,788,237**
**SCHNABEL CAR**

**Robert W. Dieckman, Deerfield Beach, Fla.; Bernd G. Albers, and John W. Mrozek, both of New Castle, Pa., assignors to Pennsylvania Engineering Corporation, Pittsburgh, Pa.**

**Filed May 17, 1972, Ser. No. 254,073**
**Int. Cl. B61d** *3/16*
**U.S. Cl. 105—367** **27 Claims**



Two substantially similar vehicles are adapted for being separated to engage a load between them and for being connected together when returning without a load. Each vehicle has a plurality of wheeled trucks which support a bolster or equalizing beam. A beam-like body which engages the load extends over the bolster. Support means are interposed between the outboard end of the body and the midregion of the bolster. Support means include means for permitting yawing, rolling, pitching and straight line transverse movement of the load body with respect to the bolster. There are also jack means in the support means for raising and lowering the outboard end of the load body. A shift control is interposed between the load body and the bolster for controlling the angular relation between the bolster and load body.

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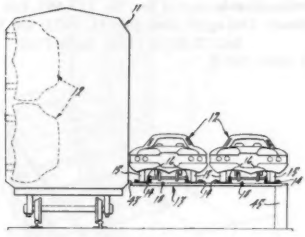
**3,788,238**
**CAR SHIPPING APPARATUS**

**James R. Bennett, New Boston, Mich., assignor to Evans Products Company, Plymouth, Mich.**

**Filed Apr. 11, 1972, Ser. No. 242,924**
**Int. Cl. B60p** *7/08;* **B61d** *45/00*
**U.S. Cl. 105—368 R** **8 Claims**



An apparatus for shipping automobiles or other motor vehicles in a larger transporting vehicle. The transporting vehicle has doors that are supported for pivotal movement about a horizontally disposed axis positioned at a lower corner of the vehicle. The doors are pivotable from an opened position in which the transported vehicles may be placed side-by-side on the doors to a closed positions in which the transported vehicles are disposed generally on their sides, one above the other. An improved arrangement is provided for tying down the cars or transported vehicles on the door so as to prevent damage when the door pivots to its closed position. This tie down arrangement simultaneously locks on to the vehicle frame or under carriage and draws the vehicle downwardly to compress

its suspension system during transit. The locking members of the tie down arrangement are positioned for access through openings in the door. In one embodiment of the invention, closures automatically cover these openings when the door moves to its closed position.

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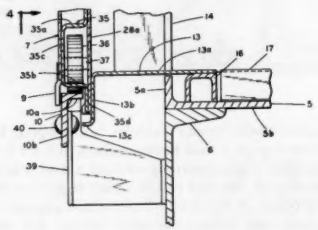
**3,788,239**
**RAILROAD FREIGHT CAR DOOR TRACK AND THRESHOLD DESIGN**

**John D. Bailey, Orland Park, Ill., assignor to Pullman Incorporated, Chicago, Ill.**

**Filed Dec. 20, 1971, Ser. No. 209,918**
**Int. Cl. B61d** *17/00*
**U.S. Cl. 105—378** **6 Claims**



A threshold seal arrangement for a box car wherein the threshold is provided with a downward depending portion connecting with a lower outwardly extending horizontal flange portion, each of the threshold portions being spaced between the door and the side sill of the car and extending through the door posts, the lower extremity of the threshold plate having the afore-mentioned out-turned horizontal flange portion being spaced underneath the door and extending toward the door track, said threshold and door track arrangement providing for a weather-free seal between the threshold and door portions of the car.

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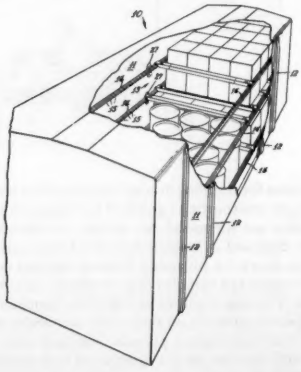
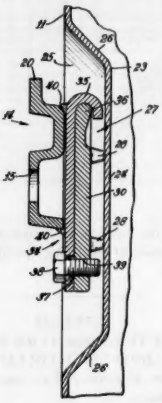
**3,788,240**
**BOX CAR HAVING BELT RAIL SUPPORTS MOUNTED ON LADING TIE ANCHORS**

**Rudolph E. Nadherny, Naperville, Ill., assignor to Illinois Railway Equipment Company, Chicago, Ill.**

**Continuation-in-part of Ser. No. 223,467, Feb. 4, 1972, abandoned. This application July 31, 1972, Ser. No. 276,404**
**Int. Cl. B61d** *45/00;* **B60p** *7/08*
**U.S. Cl. 105—369 B** **19 Claims**



Lading transport means, such as a box car, is provided with lading tie anchors having associated therewith detachable belt rail supports in the form of inverted J-shaped plates, the hook portions of which overlie the upper ends of lading tie anchors secured to the car side walls. Various arrangements are employed for detachably securing the lower ends of the belt rail supports to the respective lading tie anchors. The belt rail may



be secured to the belt rail supports by welding and may be removed therewith as a unitary structure. Key shaped openings are formed in lading tie anchors to receive through the circular portion the head of a bolt having a square shank that interfits with a rectangular part of the key shaped opening. Also a "Huck" bolt pin can be employed.

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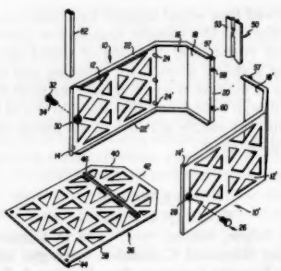
**3,788,241**
**MODULAR SHOE RACK**

**Fred A. Ravreby, P.O. Box 357, Maynard, Mass.**

**Filed Apr. 14, 1972, Ser. No. 244,128**
**Int. Cl. A47f** *5/12*
**U.S. Cl. 108—6** **33 Claims**



A modular storage unit capable of being assembled into a wide variety of configurations without the use of tools or adhesives. Each individual module is formed of two identical opposing side panels and a central shelf section. The side panels are joined at the rear and open in front, thereby defining a plurality of cubicles or storage spaces. Each side panel comprises a vertical planar side portion having a ridge extending inwardly along at least a portion of the front thereof; a vertical angled portion extending inwardly from the rear edge of the side portion and joining the side portion with a rear portion; a vertical planar rear portion extending from a rear edge of the angled portion generally perpendicular to the side portion and having a locking ridge extending outwardly along at least a

portion of a rear edge thereof; and a pair of vertically spaced horizontal support flanges extending inwardly along at least a portion of the side panel.

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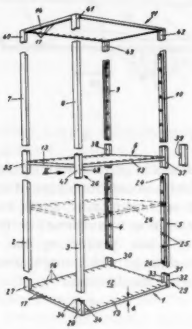
**3,788,242**
**SHELVING UNITS**

**Ernst Hassel, Neunkirchen-Salchendorf, and Adolf Schmenn, Burbach-Niederdresselndorf, both of Germany, assignors to Fritz Schaefer GmbH, Neunkirchen Kreis Siegen, Germany**

**Filed July 19, 1971, Ser. No. 163,703**
**Claims priority, application Germany, July 22, 1970, G 70 27 533.1**
**Int. Cl. A47b** *47/02*; **A47f** *5/16*
**U.S. Cl. 108—111** **3 Claims**



A shelving unit comprising a top, a base and at least one intermediate shelf, all of which have vertical stubs at their corners for attachment to uprights consisting of sheet metal profiled sections, the stubs on the intermediate shelf projecting both above and below it and being continuous over their whole height on at least two of their faces, and the uprights being notched to fit around the intermediate shelf so that the lower ends of uprights above the intermediate shelf rest upon the upper ends of uprights below it, so as to transmit loads straight through the uprights to the base. The stubs may be U-sectioned, their walls being bent inwardly at their edges, and the uprights may be of G-section dimensioned to be a force fit over the stubs. The stubs may be spot-welded to vertical flanges on the top, base and intermediate shelf.

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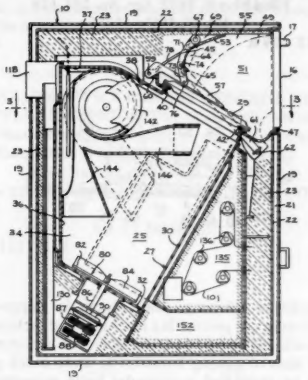
**3,788,243**
**DOMESTIC SOLID WASTE INCINERATOR**

**Christian A. Eff, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.**

**Filed Feb. 29, 1972, Ser. No. 230,283**
**Int. Cl. F23g** *3/04*
**U.S. Cl. 110—8 R** **10 Claims**

An incinerator for use in a residential kitchen with a box-like housing enclosing a combustion chamber formed by an inner liner and a top-opening access cover. The inner liner has a forwardly inclined semi-cylindrical front wall and a bottom wall generally perpendicular to the said front wall, as well as generally vertical side and rear walls. A reversible, slow-motion, motor-driven agitator is present in the bottom of the combustion chamber to shift the position of the solid-combustible load, as well as to break up the carbonized residue. The front wall of the incinerator housing has a loading door



that is connected by a linkage mechanism to the access cover whereby they move in unison for ease in loading the combustion chamber.

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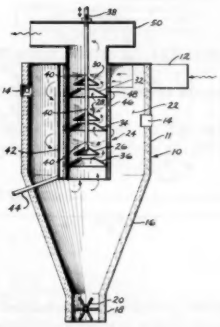
**3,788,244**
**COMBUSTION CHAMBER INCLUDING DRY AND WET COLLECTION OF PARTICULATE MATTER**

**Edwin Mark Polsak, South Euclid, and Donald Joseph Kalfas, Garfield Heights, both of Ohio, assignors to Combustion Engineering Inc., Windsor, Conn.**

**Filed Dec. 20, 1972, Ser. No. 316,791**
**Int. Cl. F23g** *5/00*
**U.S. Cl. 110—8 R** **4 Claims**



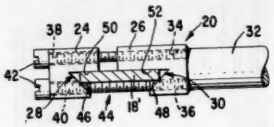
A combustion chamber having an upper cylindrical portion and a lower frustoconical portion, into which combustibles are tangentially introduced in the upper portion thereof. Incombustible solids centrifugally separated are removed through a lower outlet. An upper outlet duct means positioned within the upper cylindrical portion provides egress for the hot gases and entrained fines. A water spray and baffle arrangement located in the outlet duct means subjects the gases to a precooling and wet scrubbing action, for removing the fines therefrom.

3,788,245

## UNIVERSAL KNIFE BLOCK FOR TUFTING MACHINES

Alvin T. Bonner, Sr., Chattanooga, Tenn., assignor to The Singer Company, New York, N.Y.

Filed May 8, 1972, Ser. No. 251,128
Int. Cl. D05c *15/24*
U.S. Cl. 112—79 R 5 Claims




This disclosure relates to knife blocks for supporting the cutting knives in cut pile tufting machines and includes an adjustable knife clamping means which will accommodate a variety of sizes of cutting knives. The knife block generally comprises an elongated rectangular knife supporting body having a truncated knife supporting cavity and means for clamping a knife therein such that a knife supported in the cavity will be tightly wedged therein.

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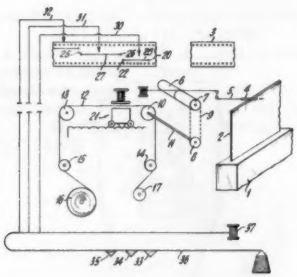
3,788,246

## APPARATUS FOR PRODUCING COLORED PATTERNS IN EMBROIDERY MACHINES

Arnold Ochsner, Harriman, N.Y.

Continuation-in-part of Ser. No. 848,840, Aug. 1, 1969, abandoned. This application May 12, 1971, Ser. No. 142,646
Int. Cl. D05c *3/04*
U.S. Cl. 112—83 4 Claims



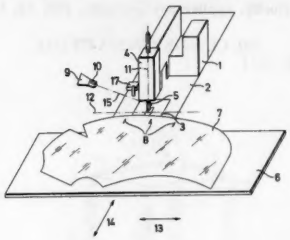
Apparatus for producing multi-colored yarn for use in Schiffli-type embroidery machines consisting of first producing a punched tape programmed according to color variations of a pattern to be embroidered on fabric material. The tape is cut simultaneously with a standard tape of the Jacquard type used on these machines. After the color tape is produced, it is used to control a multi-colored dye system where a continuously moving yarn has the different colored dyes applied thereto in accordance with the colored tape which controls the application of the dye selectively. After the yarn is completely and selectively dyed, it is inserted back onto the machine in proper sequence, and synchronized with the original standard tape so that the needle stitching produces a multi-colored embroidery according to the original design.

3,788,247

## MACHINE FOR THE STITCHING OF BUTTONHOLES ON GARMENTS

Philipp Moll, and Wolfgang Goebbels, both of Aachen, Germany, assignors to Moll Apparatebau GmbH, Aachen-Brand, Germany

Filed Dec. 20, 1972, Ser. No. 316,925
Claims priority, application Germany, Dec. 22, 1971, P 21 63 728.5
Int. Cl. D05b *21/00*
U.S. Cl. 112—121.12 11 Claims




This disclosure relates in general to a machine for stitching buttonholes in the fabric of cut-out pieces of material, particularly outer garments such as jackets, coats, trousers, etc. The purpose of the invention is to automate as much as possible buttonhole stitching while protecting the garment being operated upon from damage which might arise from a defect in the associated control mechanisms.

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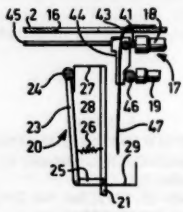
3,788,248

## SEWING APPARATUS WITH AUTOMATIC WORKPIECES STACKING MEANS

Nerino Marforio, Milan, Italy, assignor to S.p.A. Virginio Rimoldi & C., Milan, Italy

Filed May 17, 1972, Ser. No. 254,305
Claims priority, application Italy, June 18, 1971, 26012 A/71
Int. Cl. D05b *33/00*
U.S. Cl. 112—121.29 6 Claims

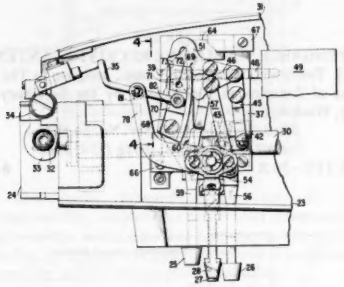



A workpiece stacking apparatus for a sewing machine for receiving workpieces after leaving the seaming area of the machine and stacking them in predetermined numbers on a movable support member in readiness for subsequent finishing operations.

## 3,788,249
## SEWING MACHINE HAVING A PLURALITY OF INTELLIGENCE RECORD SYSTEMS ASSOCIATED THEREWITH

William Weisz, Rockaway, N.J., assignor to The Singer Company, New York, N.Y.

Filed Oct. 25, 1972, Ser. No. 300,537
Int. Cl. D05b *3/02*
U.S. Cl. 112—158 R 9 Claims

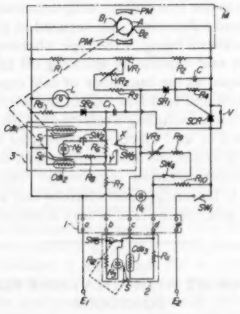


A sewing machine having stitch-forming instrumentalities, actuating mechanism for imparting operative stitch-forming movements to said stitch-forming instrumentalities and a control link operatively associated with said stitch-forming instrumentalities to thereby influence the formation of a pattern of stitches. A plurality of different intelligence record systems is provided each having its own output element which is separately connectable to said control link to impart a predetermined pattern of movements thereto, and operator influenced switching means is provided for effecting operative interconnection between the output element of any selected one of said intelligence record systems and said control link.

## 3,788,250
## SYSTEM FOR STOPPING SEWING MACHINE NEEDLE AT PREDETERMINED POSITION

Katsuji Soeda, Sukagawa, Japan, assignor to Yamamoto Electric Industrial Co. Ltd., Sukagawa-shi, Japan

Filed May 10, 1971, Ser. No. 141,733
Claims priority, application Japan, June 19, 1970, 45/61255
Int. Cl. D05b *69/22*
U.S. Cl. 112—219 A 3 Claims

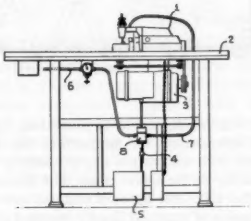


A system having means for automatically stopping the needle of an electric sewing machine at an upper or lower position in response to the stoppage of the machine during or upon completion of the sewing operation. After the stoppage, the needle can be moved to the other position and stay there by the manipulation of a change-over switch. Also, by the manipulation of a push-button switch, the needle can be stopped at such position after effecting one or more stitches at low speed. Another switch is further provided so as to cut off the needle stopping means from the power supply and stop the needle at any desired position instead of the stopping operation by the needle stopping means.

## 3,788,251
## MULTISTAGE DEVICE FOR THE CONTROL OF THE AIR SUPPLY FOR PNEUMATIC ALIGNING MEMBERS

Gunter Haak, Stuttgart, Germany, assignor to Union Special Maschinenfabrik G.m.b.H., Stuttgart, Germany

Filed Nov. 28, 1972, Ser. No. 309,964
Claims priority, application Germany, Dec. 4, 1971, G 71 45 738.0
Int. Cl. D05b *65/02*
U.S. Cl. 112—252 12 Claims

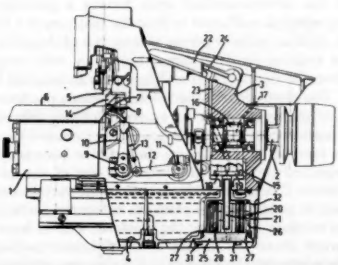


This disclosure relates to a multistage control arrangement for the control of the air supply for a pneumatic aligning member for the alignment of the threads or chains of threads relative to a cutter of a sewing machine, which in the first flow controlling position blocks the air supply in the case of a stopped sewing machine, in the second flow controlling position releases the air supply approximately simultaneously with the starting of the sewing machine, and in the third flow controlling position again blocking the air supply generally at the time when the normal operating speed of the sewing machine is reached.

## 3,788,252
## LUBRICANT PURIFICATION FILTER FOR SEWING MACHINES

Nerino Marforio, Milan, Italy, assignor to Virginio Rimoldi & C. S.p.A., Milan, Italy

Filed May 17, 1972, Ser. No. 254,041
Claims priority, application Italy, June 15, 1971, 25837/71
Int. Cl. D05f *71/00*
U.S. Cl. 112—256 3 Claims



An improved filtering device for use in sewing machines which comprises a member having a plurality of upstanding

pegs disposed in two concentric series. This element is mounted on a supporting plug which seals the chamber contacting the lubricating fluid. A quantity of filtering material is supported between the rows of pegs.

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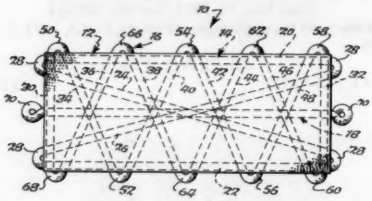
**3,788,253**
**FLEXIBLE BEARER**
**Donald F. Rickettson, Shepherd Hill Rd., East Aurora, N.Y.**
**Filed Apr. 3, 1972, Ser. No. 240,364**
**Int. Cl. D05b** *93/00;* **B32b** *5/04*
**U.S. Cl. 112—402** **3 Claims**



A flexible bearer adapted to be placed on a ground surface adjacent an excavation for supporting the loose material removed from such excavation and protecting the natural environment adjacent the excavation. The bearer comprises a body formed of a flexible sheet of material reinforced by relatively thick strips of material fixedly secured to the underside of the body. Loops are provided along the marginal edges of the body to receive hooks or other lifting means to raise portions of the bearer.

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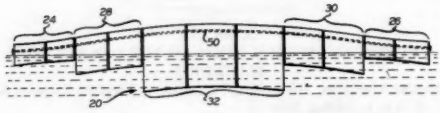
**3,788,254**
**FLOATING PLATFORM**
**John E. Sheil, 196 Black Smith Rd., Levittown, N.Y.**
**Filed Dec. 28, 1971, Ser. No. 213,102**
**Int. Cl. B63b** *35/00*
**U.S. Cl. 114—0.5 F** **15 Claims**



A floating platform having a plurality of float units which are interconnected together in end to end relation with their top surface portions being substantially flush with each other, each of the interconnected units having a predetermined buoyancy which is sufficient to float the platform in a flotation medium, such as water, wherein at least two of the units have a different relative predetermined buoyancy with respect to each other and the flotation medium prior to external loading thereof. The platform is arched along at least a predetermined portion of its length prior to external loading thereof. The arched portion may be either convex or concave or a combination thereof, depending on the relative buoyancy of the interconnected units and the intended use of the platform. Furthermore, if desired, the buoyancy of the various units may be chosen so as to float the platform below the surface of the flotation medium or to float the platform with at least a portion thereof above the surface of the flotation medium. The units are preferably interconnected by means of tension elements, such as rods or cables which are post-tensioned during the assembly of the platform. A floating platform may also be formed from a plurality of such float units which are interconnected together in side to side relation with their top surface portions being substantially flush with each other, in addition to having the units interconnected together in end to end relation. The relative buoyancies of the side to side interconnected units may also be different so as to provide a side to side arched portion as well as an end to end arched portion for the complete structure, or any combination thereof. The units are preferably interconnected in side to side relation by transverse tension elements in the same manner as the longitudinal end to end interconnections.

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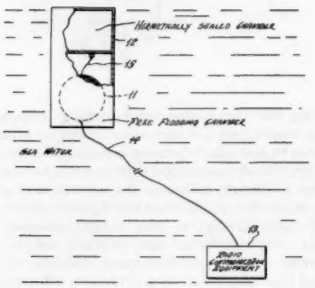
**3,788,255**
**EXPENDABLE SUBMARINE RECEIVING ANTENNA**
**James J. Tennyson, Waterford, Conn., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**
**Filed Apr. 26, 1960, Ser. No. 24,856**
**Int. Cl. F42b** *19/36;* **H01g** *1/34, 1/04*
**U.S. Cl. 114—20 R** **6 Claims**




An expendable radio communication antenna for use by a submarine submerged at a depth at which its permanent antenna installation is ineffective, comprising a buoyant capsule, having an opening extending between the interior and exterior of the capsule, for release from an ejection chamber of the submarine, a coil of lead-in wire confined within said capsule and having electrical insulation suitable for use in sea water, and being of sufficient length to extend between said submerged submarine and the surface, a free end of said wire extending freely through said opening in said capsule for withdrawal and severance of a selected length of said wire and for connection at the free end to radio communication equipment aboard said submarine, and secured at its other end to said capsule, said coil being of the type whereby the wire pays out freely from said capsule by spiraling off said coil when a tensile force equal to the buoyance of said capsule is applied between said coil and said free end of the wire, whereby said expendable antenna including a selected length of lead-in wire may be disposed in said ejection chamber of the submerged site with the free end of the lead-in wire electrically coupled to said radio communication equipment and released to buoyantly rise to the surface and whereby said antenna may be disposed of by severing the lead in wire at the submarine.

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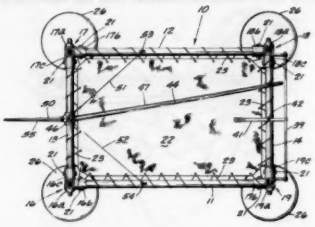
**3,788,256**
**WATERCRAFT WITH ROTATABLE FLOATING PONTOONS**
**Arthur E. Bashaw, 16900 Parthenia, Apt. No. 9, Sepulveda, Calif.**
**Filed June 6, 1972, Ser. No. 263,373**
**Int. Cl. B63b** *35/00*
**U.S. Cl. 114—39** **4 Claims**

A watercraft is provided with a frame symmetrical about a longitudinal axis and having at least two pairs of freely rotata-

ble floating pontoons. The pontoons have a generally circular disk-like configuration and a convex side in contact with the water. The disk-like pontoons are disposed so that the respective inboard portions thereof touch the water while the respective outboard portions lift out of the water, i.e., the disks



incline downwardly, inboard of the craft. To improve directional stability, rudder-like fins extend downwardly from the center of the convex surface and means are provided so that the fins, in at least one pair, are rotatable in unison about a substantially vertical axis to provide steering.

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**3,788,257**

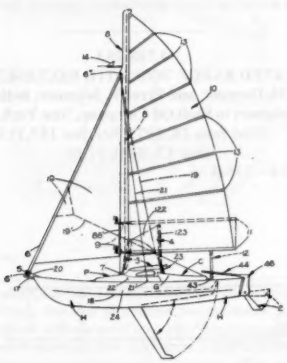
**FIN-KEEL CATAMARAN**

**Reginald T. Miller, 700 Delaware St., Berkeley, Calif.**

**Filed Sept. 7, 1971, Ser. No. 177,930**

**Int. Cl. B63b** *35/00*

**U.S. Cl. 114—39** **25 Claims**



A catamaran type yacht is disclosed which is of very narrow overall beam, having an elongated fin-type keel adjustably mounted on the fore-to-aft center line between its dual hull sections; and this fin-keel is operated adjustably under the control of a simple manual retraction mechanism. The main or wing mast of the craft has means for pivotally mounting the same at a novel stepping sub-assembly; and the mainsail boom is connected to the mast by a gooseneck loop device which allows for a tilt at an acute angle to a vertical plane including the boom axis. Provision is also made for a vertical adjusting movement of the boom in a relatively limited degree. Each hull member is equipped with a pivotally mounted kick-up rudder, the rudders being coupled for conjoint tiller operation. A solid section forestay or job spar is employed in a novel procedure of facilitating raising of the main mast above its stepping unit; and a pop-top type cabin cover is provided for installation in small yachts, with a flexible tent auxiliary shelter operatively connected to the pop-top when the latter is erected.

**3,788,258**

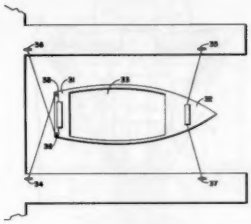
**MOORING DEVICE**

**George H. Odom, 208 Tuna, Galveston, Tex.**

**Filed Nov. 15, 1971, Ser. No. 198,557**

**Int. Cl. B63b** *21/00*

**U.S. Cl. 114—230** **8 Claims**



A mooring device comprising a tubular member having a rod member coaxially alligned therewith and lying partially therewithin and in slidable engagement therewith, a tension producing means operatively engaged with the tubular member and the rod member such as to force the two members in opposite directions from one another, a first block and tackle system having one pulling point anchored to a first anchor bar extending from the tubular member in substantial perpendicular relation thereto and the other pulling point anchored to a first anchor bar extending from the rod member in substantial perpendicular relation thereto, a second block and tackle system having one pulling point anchored to a second anchor bar extending from the tubular member in substantial perpendicular relation thereto and the other pulling point anchored to a second anchored bar extending from the rod member in substantial perpendicular relation thereto, the two first anchor means of the first block and tackle system being disposed on substantially opposite sides of the tubular and rod members from the two second anchor means of the second block and tackle system, and mooring line extending from each of the block and tackle systems.

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**3,788,259**

**COUPLING DEVICE OF USE INTER ALIA FOR THE CONNECTION BETWEEN A BARGE AND A PUSHER TUG**

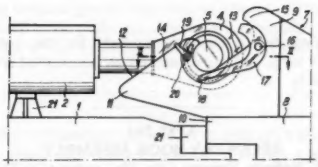
**Jean Paul Colin, Nantes, France, assignor to Societe Financiere Et Industriele Des Ateliers Et Chantiers De Bretagne, Nantes, Loire Atlantique, France**

**Filed July 10, 1972, Ser. No. 269,979**

**Claims priority, application France, Feb. 16, 1972, 7205195**

**Int. Cl. B63b** *21/62*

**U.S. Cl. 114—235 A** **5 Claims**



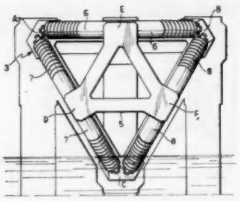
A coupling assembly for coupling a barge and pusher tug comprises a recess having at one end a hook and at the other an abutment. A pawl pivots to displace a coupling element from the hook.

3,788,260

## SHOCK ABSORBER FOR USE AS A FENDER FOR SHIPS

Emilio Morini, Milan, Italy, assignor to Societa' Applicazioni Gomma Antivibranti "Saga" S.p.A., Milan, Italy

Filed Feb. 7, 1973, Ser. No. 330,347
Int. Cl. B63b 59/02
U.S. Cl. 114—219 2 Claims



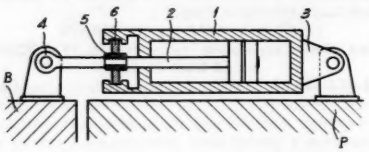
A shock absorber arrangement for use as a fender for ships and comprising a fixed plate mountable on a harbour wall and a movable plate connected thereto by an array of resilient shock absorbers of known type. The array of shock absorbers are coupled in three pairs to three points of the fixed plate, the three points lying at the apices of an equilateral triangle, and each pair of shock absorbers forms an isosceles triangle the base of which is formed by the fixed plate; the angle of the vertex of the isosceles triangle is greater than the angle of the other two apices. The three vertices of the pairs of shock absorbers are coupled to points lying at the apices of an equilateral triangle on the movable plate; the two equilateral triangles are positioned angularly displayed from one another by 60° and the two plates lie in substantially parallel planes when the arrangement is in a rest position.

3,788,261

## LOCKING DEVICE MORE PARTICULARLY FOR CONNECTION BETWEEN A BARGE AND A PUSHER TUG

Jean Paul Colin, Nantes, France, assignor to Societe Financiere Et Industrielle Des Ateliers Et Chantiers De Bretagne, Nantes, Loire Atlantique, France

Filed Feb. 10, 1972, Ser. No. 225,237
Claims priority, application France, Aug. 31, 1971, 7132331
Int. Cl. B63b 21/60
U.S. Cl. 114—235 A 7 Claims



A locking device more particularly for the connection between a barge and tug comprises an interrupted screw and nut assembly.

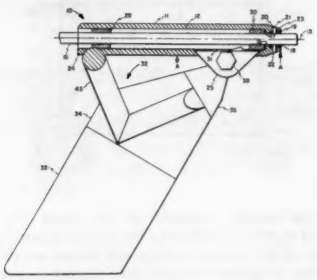
3,788,262

## RECOVERY HOOK ASSEMBLY

Donald W. Roberts, Panama City, Fla., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Dec. 4, 1972, Ser. No. 311,583
Int. Cl. B63b 21/00
U.S. Cl. 114—235 R 12 Claims

A towable hook assembly for acquiring and capturing a line streamed within water with a ball stop mounted thereon is disclosed as having a barrel with a pair of bores therethrough separated by an apertured wall, with the aperture thereof in alignment with said pair of bores. A first slot extends through the entire length of the side wall of said barrel in such manner as to be in communication with said pair of bores and said aperture, and a second slot extends through the side of said barrel, so as to be in communication with the rearward one of



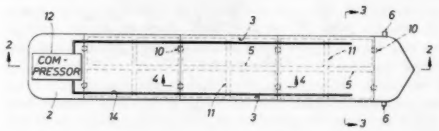
said pair of bores at a predetermined distance from the rear face of said wall. A fin having a cam at the forward upper end thereof is hinged for rotation in such manner with respect to said barrel as to allow the cam thereof to protrude through said second slot when rotationally urged by rearward drag thereon as a result of the tension being released from the tow line thereof, as said hook assembly is towed through said water, sea water, or other appropriate ambient fluid mediums.

3,788,263

## INTEGRATED BARGE TOW WITH RECESSED BOTTOM

David C. McDermott, and Errol V. Seymour, both of Houston, Tex., assignors to Shell Oil Company, New York, N.Y.

Filed June 28, 1971, Ser. No. 157,211
Int. Cl. B63b 21/00
U.S. Cl. 114—235 R 7 Claims




An integrated barge tow for use on inland waterways having disconnectable bow and towboat sections and a plurality of interior box barges with recessed bottoms to capture an air bubble reducing resistance to movement through the water.

3,788,264

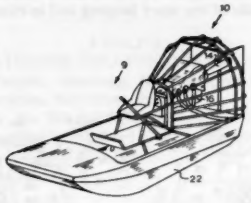
## COOLING SHROUD FOR AIRBOAT

Ivan A. Gibson, 1339 W. Washington St., Orlando, Fla.

Filed May 22, 1972, Ser. No. 255,346
Int. Cl. B60f 3/00
U.S. Cl. 115—1 R 6 Claims

An airboat having an engine mounted thereon for driving a propeller and having an engine cooling shroud attached thereto is provided for cooling the engine more effectively with the air drawn thereacross. The shroud is shaped to form a

venturi between the air inlet and outlet to increase the velocity of the air over the engine and to draw air between the cooling



fins on the engine cylinders. Baffle plates are utilized to direct the flow of the air through the finned cylinders at an increased velocity.

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**3,788,265**

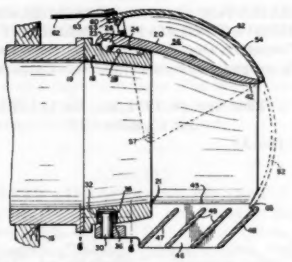
**CONTROL ASSEMBLY FOR JET BOAT**

**Cecil L. Moore, 2801 Linda Ln., West Lafayette, Ind.**

**Filed Apr. 13, 1971, Ser. No. 133,670**

**Int. Cl. B63h** *11/00, 11/10*

**U.S. Cl. 115—12 R** **5 Claims**



A control assembly for a boat having a water jet propulsion system in which the jet is moved successively through a discharge conduit and a nozzle movably mounted on said conduit. A bucket is mounted on said nozzle and is movable with and with respect to said nozzle whereby said nozzle and bucket can be moved into different positions of adjustment to control the jet for thus controlling the steering, fore and aft movements, and the desired planing of the boat.

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**3,788,266**

**MULTI-POWERHEAD OUTBOARD MOTOR**

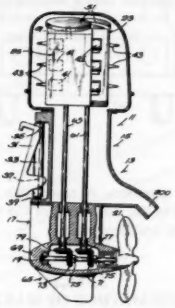
**Charles D. Strang, Lake Forest, Ill., assignor to Outboard Marine Corporation, Waukegan, Ill.**

**Filed Feb. 8, 1973, Ser. No. 330,597**

**Int. Cl. B63h** *21/26*

**U.S. Cl. 115—17** **18 Claims**

Disclosed herein is an outboard motor comprising a lower unit rigidly connected to the bottom of a drive shaft housing and including a rotatably mounted propeller shaft supporting a propeller, first and second engines respectively including first and second crankshafts and respectively mounted to the top of the drive shaft housing with the first and second crankshafts extending at an acute angle to each other, first and second drive shafts respectively drivingly connected to the first and second crankshafts and respectively extending in the drive shaft housing and in the lower unit in co-axial relation to



the first and second crankshafts, and gearing in the lower unit drivingly connecting the first and second drive shafts to the propeller shaft.

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**3,788,267**

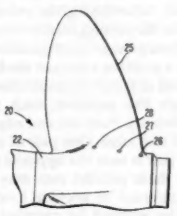
**ANTI-CAVITATION MEANS FOR MARINE PROPULSION DEVICE**

**William A. Strong, Oshkosh, Wis., assignor to Brunswick Corporation, Chicago, Ill.**

**Filed Dec. 17, 1971, Ser. No. 209,131**

**Int. Cl. B63h** *21/26*

**U.S. Cl. 115—17** **7 Claims**



Cavitation eminating from the leading edge near the hub of a propeller of a marine propulsion device is prevented by introducing exhaust gas air adjacent the junction of the leading edge of each blade of the propeller and the propeller hub from the interior of the hub through which the exhaust gas or air flows.

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**3,788,268**

**TRAFFIC WARNING SIGNAL FOR USE ON VEHICLES**

**Frank S. Hiatt, and Milton Freewater, P.O. Box 436, both of Portland, Oreg.**

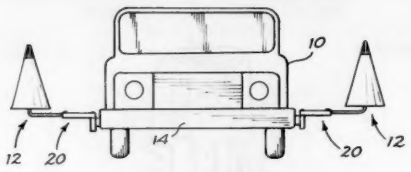
**Filed Nov. 29, 1972, Ser. No. 310,603**

**Int. Cl. B60q**

**U.S. Cl. 116—28 R** **3 Claims**

A traffic warning signal for use on vehicles, particularly highway service trucks, comprises a bracket support attachable to the vehicle, a bracket, a pivotal mounting means mounting the inner end of the bracket on the bracket support for

free swinging movement of the bracket between extended and retracted positions. Detent means releasably lock the bracket




in the retracted position. A triangular signal support is attached vertically to the outer end of the bracket for mounting a brightly colored, traffic signal.

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**3,788,269**

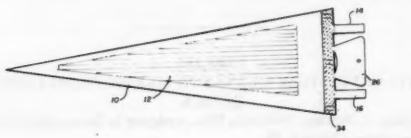
**PENNANT AND METHOD OF MAKING A PENNANT**

**Ted Scarlet, 101 Lilac Ln., Bergenfield, N.J.**

**Filed May 31, 1973, Ser. No. 365,751**

**Int. Cl. G09f** *17/00*

**U.S. Cl. 116—173** **8 Claims**



An improved pennant and the method of making this pennant is disclosed. A strip of material is brought to a printing operation whereat the desired pennant design in the number of colors is applied. After drying the colored paint or ink the strip is brought to a die cutting station whereat the pennant is cut to the preselected outer configuration. At this same or another station at a position adjacent the long end of the pennant there is formed at least two pairs of substantially parallel cuts made through the pennant, each pair of cuts being disposed a short distance from the end edge. These cuts are at right angles to this end edge. One pair of cuts is near one side edge and another pair is near the opposite side edge. The strip portions between these parallel cuts may be displaced from the plane of the pennant to provide loops through which a stick or rod may be inserted for carrying and displaying the pennant in the usual manner. In the middle of the long end is a tab having a small hole which permits the pennant to be displayed on a small pin or rod prior to its sale. This tab is attached to the long end so as to provide a support for the pennant until the time of sale at which time it is detached from the pennant body.

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**3,788,270**

**GLUE APPLYING DEVICE**

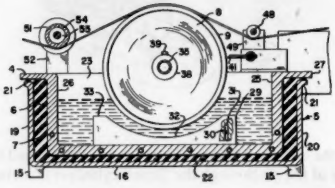
**Boyd C. Blair, Topeka, Kans., assignor to Brackett Stripping Machine Co., Inc., Topeka, Kans.**

**Filed Mar. 3, 1972, Ser. No. 231,484**

**Int. Cl. B05c** *1/08*

**U.S. Cl. 118—5** **8 Claims**

A device for melting low temperature glue or hot-melt glue and for maintaining the melted glue at a substantially uniform temperature throughout a container and for applying a coating of substantially uniform thickness of such glue to articles, and edge of sheets to form books or tablets, one side of the elongated strip of material to form tape, and the like includes a pre-melting chamber for melting glue such as low temperature or animal glue, hot-melt glue or glue at temperatures therebetween and communicating with said container. The applying device having an inner chamber with walls spaced from walls of an outer housing and having temperature insulating material filling the space therebetween. Heating units are in the walls of the inner housing and in ribs therefrom to



maintain the glue within the inner housing at a substantially uniform temperature throughout the inner housing. Rollers are rotatably mounted on one of the outer housing and the inner housing and have means movable through the glue within the inner housing to apply a coating thereof to material moved into engagement with the peripheral edges.

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**3,788,271**

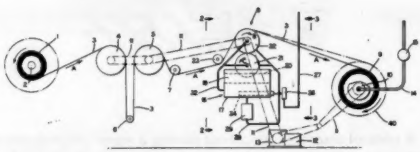
**APPARATUS FOR APPLYING PRESSURE SENSITIVE ADHESIVE TO GLASS FIBER MESH MATERIAL**

**Guy H. Carpenter, Dover, and Ernest E. Ross, Dennison, both of Ohio, assignors to Perma Glas-Mesh Corporation, Dover, Ohio**

**Filed Apr. 14, 1971, Ser. No. 133,982**

**Int. Cl. B05c** *1/12*

**U.S. Cl. 118—33** **4 Claims**



Adhesive coating equipment having an adhesive reservoir heated by circulating electrically heated oil. A first lower hollow roller is mounted above the reservoir having a lower portion immersed in the adhesive contained in the reservoir. A power driven second hollow top roller is mounted above and in contact with the first roller and rotates the first roller transferring adhesive from the reservoir to the first roller and then to the top roller for coating a web passing over the top of the second roller. The rollers are heated by heated oil circulated through the interior of the rollers to maintain the rollers and adhesive at the same temperature and the adhesive at the same viscosity throughout the transfer of adhesive from the reservoir to the web. An idler roller is located adjacent to the lower and top rollers for maintaining at least a predetermined minimum arcuate length of web contact with the second or top roller.

A method of applying pressure sensitive adhesive to glass fiber mesh material by passing the mesh material over a heated rotating coating roller. Heated adhesive is applied to the coating roller which is transferred to the mesh material by contact with the roller as the mesh passes over the roller. The

length or duration of contact of the mesh material with the coating roller is controlled so that a uniform amount of adhesive is applied to the mesh material. The mesh material is maintained under constant tension as it is payed out from a supply roll and over the coating roller to a collection roll.

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3,788,272

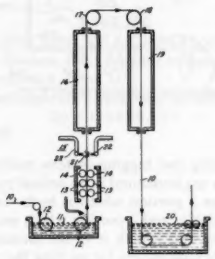
**APPARATUS FOR TREATING A FLUX COATING**

**Richard A. Peoples, Hamburg, N.Y., assignor to Bethlehem Steel Corporation, Bethlehem, Pa.**

**Division of Ser. No. 780,062, Nov. 29, 1968, Pat. No. 3,635,748. This application Nov. 1, 1971, Ser. No. 194,593**

**Int. Cl. C23c** *13/02, 3/00*

**U.S. Cl. 118—47** **4 Claims**



An apparatus for providing a smooth coating of flux material uniformly distributed on a metal surface comprising directing a flame onto the flux coated surface. The apparatus comprises a flame distributor adapted to contact the surface of the flux coating with a high-heat flame. The impingement of the flame on the flux surface causes an initial set in the flux surface which is smooth and evenly distributed.

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3,788,273

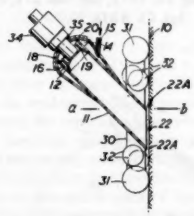
**UNDERWATER SPRAYING APPARATUS**

**Nicholas Norbert Tusch, Marble Arch London; Robert Ian Watson, Blackburn, and Jack Taylor, Accorington, all of England, assignors to Colebrand Limited, London, England**

**Filed Aug. 24, 1971, Ser. No. 174,445**

**Int. Cl. B05c** *5/00*

**U.S. Cl. 118—50** **13 Claims**



Method and apparatus for applying paint or the like to a submerged surface and includes the provision of a hollow shield with an elongated opening which shield is purged of water by compressed air the resultant airfilled space being traversed by a sheet-like spray of the paint supplied from atomising means and formed so as to be substantially uninterrupted by the internal wall of the shield. Various means are described by way of elaboration of the actual margin of the shield to accommodate different surfaces; to provide for maintaining appropriate spacing between the margin of the shield and the surface and for affording mobility of the whole apparatus.

3,788,274

**PROTECTIVE APPLIANCE FOR USE DURING PAINTING**

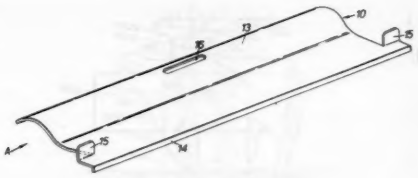
**Andrew McNaughton, 6 Glamis Pl., and Bruce D. Hutchison, 39 Glendevon Rd., both of Perth, England**

**Filed Nov. 21, 1972, Ser. No. 308,444**

**Claims priority, application Great Britain, Nov. 23, 1971, 54,241/71**

**Int. Cl. B05c** *11/00*

**U.S. Cl. 118—504** **4 Claims**



An appliance for protecting edge portions of floor coverings, for example carpets, during the painting of adjacent parts of walls, skirting boards and the like is described. The appliance consists of a generally rectangular thin aluminum plate whereof one long edge is flanged through 90° to form a narrow lip for insertion between a carpet edge and an adjacent skirting board. On the plate, adjacent each end of the lip, stops projecting oppositely from the lip serve to prevent overreaching during painting. The plate is of shouldered configuration as seen in end elevation to facilitate hand-gripping through a slot in the shouldered portion. The stops are in the form of bent-up tags or in the form of posts.

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3,788,275

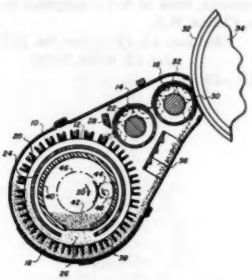
**MAGNETIC SHIELDING APPARATUS**

**William J. Hanson, Pittsford, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Filed June 28, 1972, Ser. No. 266,905**

**Int. Cl. G03g** *13/08*

**U.S. Cl. 118—637** **14 Claims**



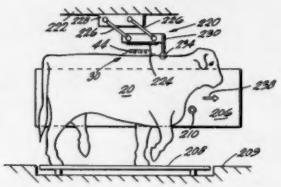
A device in which a magnetic flux field forms a shield of magnetic granules about a shaft member journaled for rotary movement. The shield is arranged to prevent contamination of the shaft member.

The foregoing abstract is neither intended to define the invention disclosed in the specification nor is it intended to be limiting as to the scope of the invention in any way.

## 3,788,276
## ANIMAL MARKING APPARATUS AND METHOD

Robert L. Propst, and Howard B. Propst, both of Ann Arbor, Mich., assignors to Herman Miller, Research Corporation, Ann Arbor, Mich.

Division of Ser. Nos. 159,784, July 6, 1971, which is a continuation-in-part of Ser. No. 12,056, Feb. 17, 1970, abandoned. This application Aug. 10, 1972, Ser. No. 279,631
Int. Cl. A01k 5/00
U.S. Cl. 119—1 16 Claims

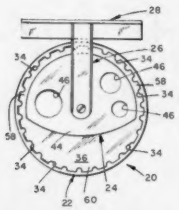


A record keeping and tagging system made possible by a machine readable tag implanted in an animal by a tagging gun. The tag comprises a portion which is both visually readable and machine readable, and a portion which includes barbs or spring-biased tines which lock it to the animal. The tagging gun comprises cocking means for moving the tag-like article into a firing position, releasing means for releasing the article from the cocking means, means for firing the article, and triggering means for activating the cocking means and releasing means in sequence by applying a force in a single direction. An information retrieval station features a chute with compressible sides and a weighing and measuring platform, and a machine reader which is automatically positioned with respect to the tag when the animal triggers a photoelectric sensing device, so as to read out the information coded therein while the animal is weighed and/or measured. A computer can be utilized to compare the animal's weight and measurement determined so as to further direct the processing of the animal.

## 3,788,277
## ANIMAL EXERCISER AND ACTIVITY DEVICE

Allan H. Willinger, New Rochelle, and Albert J. Dinnerstein, Far Rockaway, both of N.Y., assignors to Metaframe Corporation, Clifton, N.J.

Filed Jan. 14, 1972, Ser. No. 217,872
Int. Cl. A01k 29/00
U.S. Cl. 119—29 12 Claims

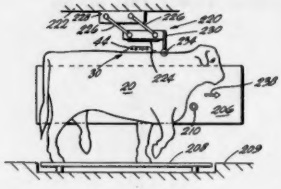


An activity device for animals of rodent variety, the device comprising a revolvable drum and a housing commonly supported so as to permit rotation of the drum relative to the housing as an animal moves along the interior of the drum.

## 3,788,278
## ANIMAL MARKING APPARATUS AND METHOD

Robert L. Propst, and Howard B. Propst, both of Ann Arbor, Mich., assignors to Hermann Miller Research Corporation, Ann Arbor, Mich.

Division of Ser. No. 159,784, July 6, 1971, which is a continuation-in-part of Ser. No. 12,056, Feb. 17, 1970, abandoned. This application Aug. 10, 1972, Ser. No. 279,352
Int. Cl. A01k 5/00
U.S. Cl. 119—51 R 15 Claims

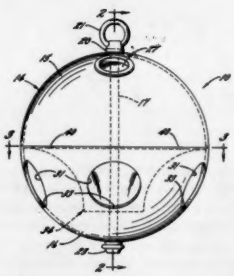


A record keeping and tagging system made possible by a machine readable tag implanted in an animal by a tagging gun. The tag comprises a portion which is both visually readable and machine readable, and a portion which includes barbs or spring-biased tines which lock it to the animal. The tagging gun comprises cocking means for moving the tag-like article into a firing position, releasing means for releasing the article from the cocking means, means for firing the article, and triggering means for activating the cocking means and releasing means in sequence by applying a force in a single direction. An information retrieval station features a chute with compressible sides and a weighing and measuring platform, and a machine reader which is automatically positioned with respect to the tag when the animal triggers a photoelectric sensing device, so as to read out the information coded therein while the animal is weighed and/or measured. A computer can be utilized to compare the animal's weight and measurement determined so as to further direct the processing of the animal.

## 3,788,279
## FEEDER FOR CLINGING TYPE BIRDS

Robert R. Boehland, Jr., Linn, Wis., assignor to Feather Hill Industries, Inc., Zenda, Wis.

Filed July 14, 1972, Ser. No. 271,924
Int. Cl. A01k 39/00
U.S. Cl. 119—52 R 7 Claims



A bird feeder includes a hollow globe comprising upper and lower hemispherical sections held together by an elongated rod. A funnel mounted within the globe divides the interior

into an upper storage area for bird feed and a lower feeding chamber. An orifice forming the lower end of the funnel is located above the bottom of the chamber to direct the flow of feed from the storage area into the chamber. A plurality of ports in the side of the lower hemispherical section communicate with the chamber and include bottom edges which are located in vertical relation to the position of the orifice whereby clinging birds may grasp on the edges and reach the feed within the chamber while other types of birds are discouraged from perching on the feeder and eating feed from the chamber.

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**3,788,280**

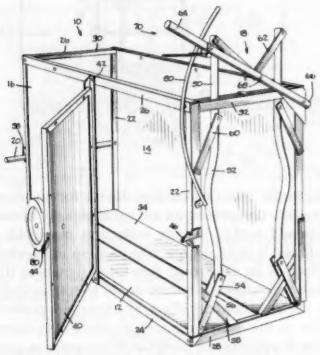
**ANIMAL ENCLOSURE AND GATE THEREFOR**

**Carl Van Gilst, Goshen, Ind., assignor to Bangor Punta Operation, Inc., Greenwich, Conn.**

**Filed Sept. 15, 1972, Ser. No. 289,495**

**Int. Cl. A61d** *3/00*

**U.S. Cl. 119—99** **6 Claims**



The enclosure includes bottom and upstanding side walls with the gate at one end, one of the side walls having a pivoted panel forming a door for access within the enclosure. Wheels are carried by the enclosure and are pivotable between a first position rendering the enclosure transportable and a second out-of-the-way position rendering it immobile. The gate includes a pair of upstanding animal restraining members movable toward and away from one another by pantographic linkages connected to the side frames of the gate, the members being bowed outwardly intermediate their lengths. A lever is pivotably connected to the frame and to like ends of a pair of links which are in turn pivotably connected at their opposite ends to the restraining members. Swinging movement of the lever in opposite directions operates to move the members toward and away from one another whereby the members can be spaced selected distances one from the other. An upstanding arcuate rod is mounted on one side of the frame. The operating lever carries a locking bar which releasably frictionally engages the rod whereby the locking lever can be locked in selected positions thereby locating the members at a selected distance one from the other and also locking the members from movement in a direction away from one another.

**3,788,281**

**PROCESS AND WASTE-HEAT BOILER FOR COOLING SOOT-CONTAINING SYNTHESIS GAS**

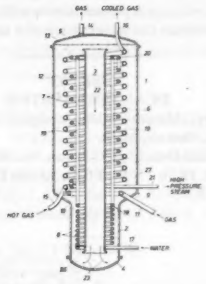
**Nicolaas Van Lookeren Campagne, Hague, Netherlands, assignor to Shell Oil Company, New York, N.Y.**

**Filed Mar. 19, 1973, Ser. No. 342,670**

**Claims priority, application Netherlands, Mar. 27, 1972, 7204070**

**Int. Cl. F22b** *1/06*

**U.S. Cl. 122—7 R** **16 Claims**




Hot, soot-containing synthesis gas obtained by the incomplete combustion of carbonaceous fuels is cooled and heat abstracted therefrom in a waste-heat boiler containing one or more helically coiled tubes through which the hot gas is passed and one or more additional tubes through which steam is passed, said tubes being in external, heat-exchanging contact with a molten metal, metal alloy or metal salt coolant medium. The disclosed process and apparatus permit the generation of high pressure, superheated steam from synthesis gas while avoiding excessive pressure differences across the helically coiled gas tubes.

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**3,788,282**

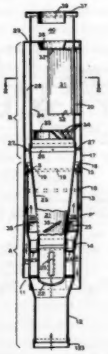
**VAPOR-LIQUID SEPARATOR**

**Thomas M. Modrak, Beloit, and Robert W. Curtis, Alliance, both of Ohio, assignors to The Babcock & Wilcox Company, New York, N.Y.**

**Filed June 27, 1968, Ser. No. 740,614**

**Int. Cl. B04c** *5/26, 5/28*

**U.S. Cl. 122—34** **5 Claims**



A primary vapor-liquid separator apparatus having two cyclonic stages of separation which operate in series to

remove successive fractions of liquid from an inflowing vapor-liquid mixture. The first separating stage has a vertical, annular flow channel in which swirl vanes are installed to impart a whirling motion to the inflowing mixture to centrifugally separate therefrom the first fraction of liquid which is removed through a skimming slot opening within the flow channel wall. The second stage of separation is a tangential inlet cyclone mounted superjacent the first stage which allows the separated vapor to leave the second stage in an upwardly directed flow path coaxially aligned with that of the inflowing mixture to the first stage, while the separated liquid is discharged from the bottom of the cyclone into a collecting chamber from whence it passes to mix with the first separated liquid fraction within the water space of a steam generator.

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**3,788,283**

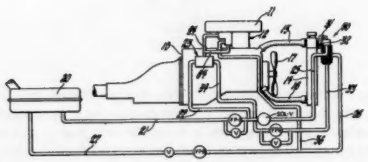
**DUAL FUEL SYSTEM**

**James C. Perry, Almont, Mich., assignor to General Motors Corporation, Detroit, Mich.**

**Filed Oct. 27, 1972, Ser. No. 301,653**

**Int. Cl. F02b** *51/00*; **F02m** *33/00*; **F02n** *17/04*

**U.S. Cl. 123—3** **3 Claims**



A dual fuel system for an internal combustion engine having a carburetor supplied with high volatility fuel for engine starting and then with regular fuel for continued normal engine operation, an on board still being used to distill the high volatility fuel from the regular fuel during engine operation, the thus distilled fuel being stored for use during the next engine start-up.

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**3,788,284**

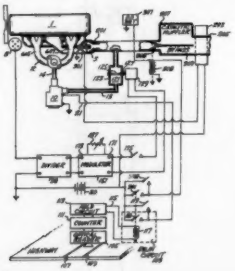
**FEEDBACK MODULATION OF EXHAUST GASES IN INTERNAL COMBUSTION ENGINES**

**Conrad O. Gardner, 22905 108th West, Edmonds, Wash.**

**Filed May 22, 1972, Ser. No. 255,327**

**Int. Cl. F02b** *33/00*

**U.S. Cl. 123—119 A** **18 Claims**



A system for modulation of the amplitude of engine exhaust feedback to the engine induction system during engine operation. The modulation system includes means for varying the amplitude of exhaust feedback in periodic manner at a frequency which is substantially constant or which may vary as a function of an engine operating parameter. The amplitude may vary as a step function between predetermined levels or continuously and may have a duty cycle (length of time at a predetermined level) which varies as a function of an engine operating parameter, e.g. exhaust manifold temperature. The modulation envelope is controlled by a modulator circuit controlling a valve position in the feedback path. The frequency of modulation is controlled by a divider or multiplier type circuit coupled between a pulse source e.g. the distributor and the modulator circuit.

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**3,788,285**

**ELECTRONIC FUEL INJECTION CONTROL DEVICE**

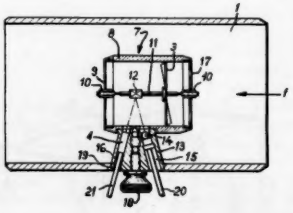
**Jacques Andre Gelin, and Alain Joseph Dera, both of Billancourt, France, assignors to Regie Nationale Des Usines Renault Billoncourt, Hauts-de-Seine, France**

**Filed Dec. 6, 1971, Ser. No. 204,970**

**Claims priority, application France, Dec. 11, 1970, 70.44781**

**Int. Cl. F02b** *3/00*; **F02m** *39/00*; **B21d** *13/04*

**U.S. Cl. 123—32 EA** **5 Claims**



An electronic injection control device for an internal combustion engine comprising an air input pick-up consisting of a helix disposed within the air induction manifold, a photodiode cell and a light source, the pick-up delivering through the medium of an electronic generator signals in the form of gating pulses having a duration equal to a frequency proportional to the measured air input, an electronic power assembly responsive to the generator and an electronic corrective assembly for modifying the duration of the gates as a function of various parameters, the signals controlling the injection action of the fuel injector.

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**3,788,286**

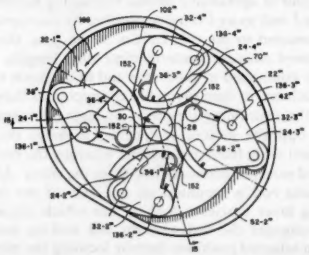
**PISTON ENGINE**

**John A. Brewer, 2120 Kensington Blvd., Fort Wayne, Ind.**

**Continuation-in-part of Ser. No. 69,006, Sept. 2, 1970, abandoned. This application Apr. 2, 1971, Ser. No. 130,685**

**Int. Cl. F02b** *57/00*

**U.S. Cl. 123—43 C** **13 Claims**



An internal combustion engine having a rotor member journaled in a casing member for rotation about a first axis. A

cylinder is provided on one of the members and has a piston received therein which oscillates between extended and retracted positions. The other of the members is provided with a cam surface having high and low extremities and there are means on the piston forcibly engaging the cam surface, the engaging means in the retracted and extended position engaging the high and low cam surface extremities respectively. The engaging means reacts against the cam surface along a force line laterally off-set from the axis of the rotor member and at generally right angles to a plane therethrough, whereby extension of the piston from its retracted to its extended position causes relative rotation of the rotor member with the engaging means moving over the cam surface from its high towards its low extremity and its point of engagement therewith at all rotational positions between the extremities of the cam surface being on the aforementioned force line.

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**3,788,287**

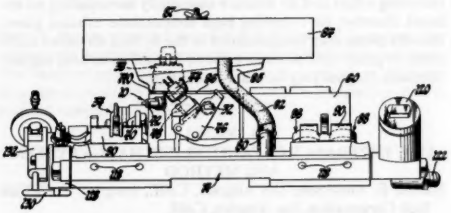
## FUEL INJECTION SYSTEM

**Walter S. Falen, Greece, and Anthony J. Giardina, Rochester, both of N.Y., assignors to General Motors Corporation, Detroit, Mich.**

**Filed Feb. 18, 1972, Ser. No. 227,428**

**Int. Cl. F02b** *75/22*

**U.S. Cl. 123—52 MV** **1 Claim**



In an electronically controlled fuel injection system, the fuel injectors and other components are mounted on extruded rails each having a fuel passage and an atmospheric air gallery formed during extrusion.

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**3,788,288**

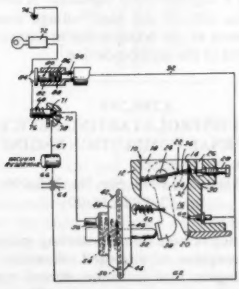
## CARBURETOR THROTTLE VALVE POSITIONER

**Robert S. Harrison, Detroit, and Max W. Lunsford, Southfield, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.**

**Continuation-in-part of Ser. No. 120,953, March 4, 1971, Pat. No. 3,682,148. This application June 23, 1972, Ser. No. 265,873**

**Int. Cl. F02d** *11/08, 9/00*; **F02m** *7/00*

**U.S. Cl. 123—97 B** **8 Claims**



One embodiment of a downdraft type carburetor has an idle system discharge port that is straddled by the idle speed and closed throttle positions of the throttle valve so as to permit idle speed fuel and air flow in one position and no flow in the other position; another embodiment has a conventional idle system with a transfer port straddling the edge of the throttle valve in the idle speed position of the throttle valve so as to permit normal idle speed fuel and air flow in this position, while being closed off or having its area that is exposed to the vacuum signal reduced in the closed position of the throttle valve to reduce idle channel flow; the two positions being controlled by a servo operatively engaging the throttle valve; the servo operation being controlled by intake manifold vacuum during engine deceleration operation to close the throttle valve, or upon engine shut off interrupting the ignition circuit to close the throttle valve with a subsequent return of the throttle valve to its curb idle position for engine restarting.

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**3,788,289**

## AIR-COOLED INTERNAL COMBUSTION ENGINE WITH SPEED CONTROL

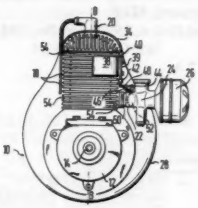
**Bruno Pfister, Sennfeld, Germany, assignor to Fichtel & Sachs AG, Schweinfurt, Germany**

**Filed July 7, 1972, Ser. No. 269,763**

**Claims priority, application Germany, July 9, 1971, P 21 34 187.7**

**Int. Cl. F02d** *11/08*

**U.S. Cl. 123—103 B** **12 Claims**



Air blown over the cooling fins on a cylinder of an internal combustion engine by an engine-driven blower moves a spring-loaded vane away from a position of abutment against the fins. The vane is linked to a throttle valve in the intake pipe for the fuel mixture and is located on the same side of a reference plane through the cylinder axis which is perpendicular to the axis of the intake pipe, thereby making the connecting linkage short and simple, or even permitting the vane to be mounted on the pivot shaft of the throttle valve. The virtual absence of friction losses in the linkage permits the engine speed to be held closely constant by the vane throttling the fuel supply when the engine speed, and therefore the blower output increases.

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**3,788,290**

## DISTRIBUTOR ACTUATOR UNIT WITH SOLENOID ADVANCE

**Ivor W. Carter, Detroit, and Ian J. C. Scott, Madison Heights, both of Mich., assignors to Chrysler Corporation, Highland Park, Mich.**

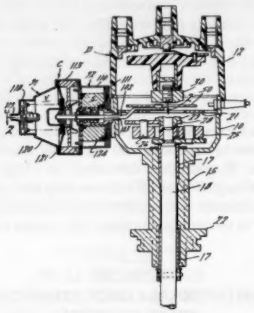
**Filed Aug. 4, 1971, Ser. No. 168,880**

**Int. Cl. F02p** *5/04*

**U.S. Cl. 123—117 A** **12 Claims**

A combination vacuum and solenoid operated actuator unit attachable to an ignition distributor of an emissions controlled internal combustion engine and enabling selective independent spark advance adjustment of the engine timing mechanism between positively established differential stop positions from an initial setting for reduced emissions at engine idling conditions. The solenoid is of the continuous duty

variety energized through the vehicle ignition switch during starting operation of the engine and serves to provide a



predetermined amount of spark advance during cranking of the engine to improve startability, especially with lean fuel air mixtures.

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**3,788,291**

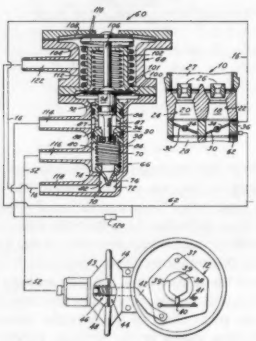
**UNITIZED DISTRIBUTOR VACUUM SPARK ADVANCE CONTROL VALVE WITH REGULATOR**

**Tao-Yuan Wu, Ann Arbor, Mich., assignor to Ford Motor Company, Dearborn, Mich.**

**Filed Oct. 4, 1972, Ser. No. 295,049**

**Int. Cl. F02p** *5/04*

**U.S. Cl. 123—117 A** **5 Claims**



An engine spark timing control system includes a conduit connecting carburetor spark port vacuum to the distributor servo actuator in parallel paths one of which contains an orifice for normally slowly advancing the ignition timing as a function of changes in spark port vacuum; the system also includes a valve operable at low vacuum force levels in response to predetermined acceleration movements of the throttle valve to disconnect or block the direct connection from the spark port to the distributor servo while at the same time connecting a vacuum reservoir to the servo to artificially advance the ignition timing above the value that normally would be called for by the spark port vacuum level; the higher than normal advance decaying by bleed of the vacuum through the spark port line orifice until the vacuum level equals that at the spark port, at which time the ignition timing will be returned to normal; the device further including a vacuum relief valve to limit the maximum level of vacuum in the reservoir so as not to unduly advance the ignition timing beyond a desired value.

**3,788,292**

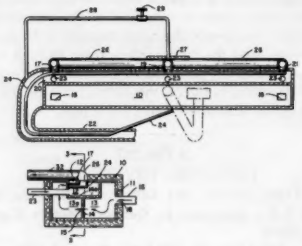
**FUEL HEAT EXCHANGER FOR INTERNAL COMBUSTION ENGINE AND METHOD OF USE**

**Seth Lee, Jr., Rt. 1, Coats, N.C.**

**Continuation-in-part of Ser. No. 188,726, Oct. 13, 1971, abandoned. This application Oct. 5, 1972, Ser. No. 295,243**

**Int. Cl. F02m** *31/08, 25/06*

**U.S. Cl. 123—122 A** **14 Claims**



Apparatus for gasifying a fuel and air mixture in an internal combustion engine comprising a baffled inlet chamber for receiving a fuel and air mixture essentially surrounding an exhaust chamber for receiving high temperature exhaust gases, thereby promoting temperatures in the baffled chamber sufficient to gasify said mixture prior to induction to said engine. Methods for gasifying fuels are also taught.

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**3,788,293**

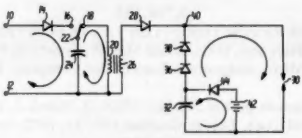
**LOW IMPEDANCE CAPACITOR DISCHARGE SYSTEM AND METHOD**

**Harold E. Anderson, Los Angeles, Calif., assignor to McCulloch Corporation, Los Angeles, Calif.**

**Filed Nov. 10, 1972, Ser. No. 305,308**

**Int. Cl. F02p** *1/00*

**U.S. Cl. 123—148 E** **22 Claims**



A low impedance capacitor discharge ignition system and method in which a supplemental capacitor is utilized on the secondary winding side of the high voltage transformer to avoid the impedance of the transformer in sustaining the gap ionization potential of the ignition device.

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**3,788,294**

**REMOTE CONTROL STARTING DEVICE FOR INTERNAL COMBUSTION ENGINE**

**Hubert Logan, Rt. 2, Athens, Ga.**

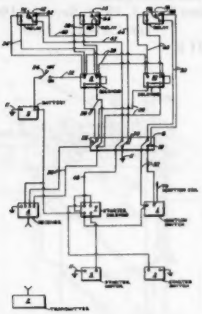
**Filed Dec. 21, 1971, Ser. No. 210,499**

**Int. Cl. F02n** *11/00*

**U.S. Cl. 123—179 BG** **12 Claims**

A radio frequency remote control starting system for internal combustion engines is disclosed. A radio receiver is located at the engine that is to be started remotely and preferably mounted on or near the engine. The output of this receiver is connected to a plurality of solenoids and relays which are utilized to start the engine in response to an output

signal from the receiver. The relays and solenoids are connected in parallel with the conventional starting system of the engine. An "on-off" switch is provided in the battery circuit of the engine. When the switch is in the "on" position, the engine can be started either remotely or by the conventional starting



system. However, when the switch is in the "off" position, the engine can be started only by the conventional starting system. The receiver produces a signal to start the engine in response to a signal received from a small portable transmitter that is located remote from the engine.

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**3,788,295**

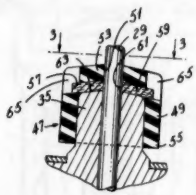
**VALVE STEM OIL SEAL AND LUBRICATOR**

**Steve Toth, Detroit, Mich., assignor to Ford Motor Company, Dearborn, Mich.**

**Filed Dec. 11, 1972, Ser. No. 313,711**

**Int. Cl. F01l** *3/00*; **F16k** *41/00*

**U.S. Cl. 123—188 P** **8 Claims**




A valve stem oil seal and lubricator for an internal combustion engine intake or exhaust valve comprising a capillary member surrounding and slidably engaging the valve stem. The capillary member is enclosed and retained by a seal or scraper member positioned over and about the valve guide boss. The seal member has an orifice which strips oil from the reciprocating valve stem and directs it toward the periphery of the seal member. Limited portions of the capillary member are exposed to this oil flow and carry a regulated portion of the oil back to the valve stem for its lubrication.

**3,788,296**

**DEVICE FOR APPLYING MEDICAL SUBSTANCES TO THE NASAL MUCOSA**

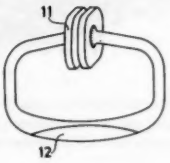
**Peter Klatt, Kelkheim, Taunus; Karl Seeger, Hofheim, Taunus, and Wolfgang Wilborn, Eppstein, Taunus, all of Germany, assignors to Farbwerke Hoechst Aktiengesellschaft vormals Meister Lucius & Bruning, Frankfurt/Main, Germany**

**Filed May 19, 1972, Ser. No. 255,077**

**Claims priority, application Germany, May 22, 1971, P 21 25 464.8**

**Int. Cl. A01k** *15/00*; **A61m** *15/08*

**U.S. Cl. 128—268** **11 Claims**




Device for the application of active substances via the mucosa or perorally and/or by aspiration, having a ring-like or clamp-like form suitable for being fixed in or on the nasal septum of animals and containing the active medical substance either applied to, imbedded in or incorporated into the body of said device.

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**3,788,297**

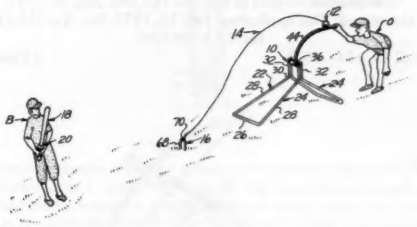
**BALL-PITCHING DEVICE**

**Walter Borst, 20919 Thiele Dr., St. Clair Shores, Mich.**

**Filed Aug. 14, 1972, Ser. No. 280,656**

**Int. Cl. A63b** *69/40*

**U.S. Cl. 124—7** **4 Claims**



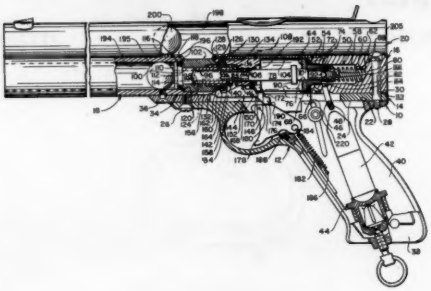

Mounted on a stand or supporting frame is the lower end of a leaf spring, to the upper end of which is attached a handle immediately below which is a ball-holding cup. To a ball adapted to be placed in the cup is connected one end of a cord, the other end of which is attached to a stake driven into the ground between the operator and the batter. In use, the handle is drawn backward and downward by the operator to bend the leaf spring into an arc, and the ball is then placed in the cup. The operator then releases the handle whereupon the force of the leaf spring upon its release pitches the ball toward the batter, who attempts to hit it. Whether he hits it or not, the cord tethered to the stake limits the flight of the ball, prevents loss of the ball and enables its easy recovery and retraction by the batter or operator for another pitch. An annular hand guard around the bat near the hand grip prevents winding of the cord around the batter's hands.

3,788,298

## COMPRESSED GAS GUN WITH TRIGGER OPERATED HAMMER RELEASE LATCHING STRUCTURE

James C. Hale, Pea Ridge, Ark., assignor to Victor Complometer Corporation, Chicago, Ill.

Filed June 19, 1972, Ser. No. 263,999
Int. Cl. F41b *11/06*
U.S. Cl. 124—11 R 14 Claims



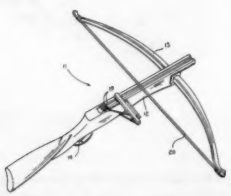
A gun operable by compressed gas held in a storage chamber by a selectively releasable valve and having valve operating structure comprising: a bolt member manually movable between a firing position and a loading position, a hammer member releasably held to the bolt member in the firing position against the bias of a compression spring operable to drive the hammer member away from the bolt member to a valve opening position, a valve operating stem engageable by the hammer member during movement to the valve opening position, and trigger operated releasable latching structure to releasably hold the hammer member to the bolt member.

3,788,299

## AUTOMATICALLY RELEASABLE ARROW HOLDING DEVICE FOR A CROSSBOW

Frederic M. Mathews, Lumberton, N.C., assignor to Honeywell Inc., Minneapolis, Minn.

Continuation-in-part of Ser. No. 167,190, July 29, 1971, abandoned. This application Feb. 16, 1973, Ser. No. 333,141
Int. Cl. F41b *5/00*
U.S. Cl. 124—35 R 4 Claims



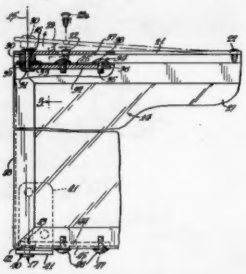
A device for attachment to a crossbow for preventing an arrow from falling off the crossbow when the crossbow is tipped or turned upside down. The device has a pivotally mounted finger that can be pivoted into engagement with an arrow in place on the crossbow. The finger has a colloidal material at one end that engages the arrow and absorbs motions and shock but does not pass them on to the arrow. Beneath and at the opposite end of the finger a resilient member biases the opposite end of the finger out of engagement with the arrow. A member is attached to the finger and to the trigger to prevent the finger from moving out of engagement with the inplace arrow. When the trigger is actuated the bow-string is released, the member attached to the trigger is then released, and the resilient member is freed to act on the finger and bias it out of engagement with the inplace arrow.

3,788,300

## OVEN DOOR MOUNTING MEANS

John T. Doner, Marion, Ohio, assignor to Whirlpool Corporation, Benton Harbor, Mich.

Filed Nov. 5, 1971, Ser. No. 196,071
Int. Cl. A21b *3/00*
U.S. Cl. 126—21 R 14 Claims



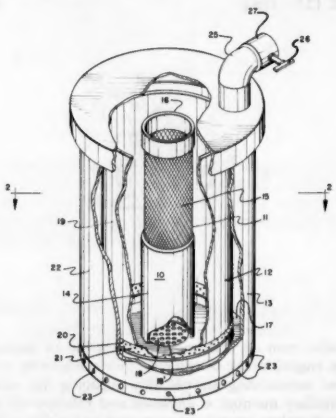
Means for mounting a door selectively across the front opening of an oven wherein pivot means are provided at one end of the door for mounting the door to a lower portion of the oven cabinet and to a trim strip at the top of the oven cabinet. The trim strip is arranged to define, with the door, a vent space for conducting hot gases from the oven forwardly therethrough. The trim strip is deflectible to permit facilitated removal of the door from the oven when desired. The trim strip is arranged to permit facilitated adjustment of the mounting of the upper pivot means on the door.

3,788,301

## SMOKE GENERATOR

Raymond M. Terry, 1111 Aladdin Ave., San Leandro, Calif.

Filed July 31, 1972, Ser. No. 276,602
Int. Cl. A01g *13/06*
U.S. Cl. 126—59.5 3 Claims



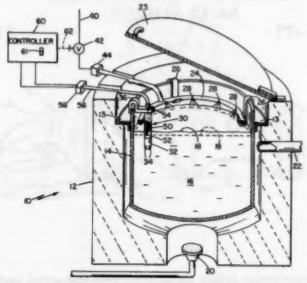
The smoke generator comprises a plurality of concentric chambers, the innermost of which fuel is provided to burn to produce aeromatic smoke and the outer chambers being operable to contain smoke produced by the fuel.

**3,788,302**

## MAINTAINING THE WATER LEVEL IN BAKING BEANS

**Samuel T. Malaney, Cape Elizabeth, and John W. McManus, Portland, both of Maine, assignors to William Underwood Company, Watertown, Mass.**

**Filed Oct. 29, 1971, Ser. No. 193,711**
**Int. Cl. A47j *27/00***
**U.S. Cl. 126—374** **6 Claims**




Apparatus for baking a pot of beans comprising an oven for receiving therein and heating the pot, a water distributer to discharge water into the pot while the pot is in the oven, a water supply piped to the water distributer, a valve for regulating flow of water from the water supply to the distributer, a fluid level sensor for sensing the level of fluid in the pot while the pot is in the oven, a controller responsive to the sensor and controlling the valve, the controller being operatively connected to maintain during baking the level of fluid in the pot within a predetermined range. Method for baking a pot of food comprising the steps placing the pot in an oven, placing a water distributer in position to discharge water into the pot, installing a liquid level detector in position to detect the level of liquid in the pot while in the oven, connecting the level detector and the water distributer to automatic control equipment responsive to the level detector and operative to control flow of water to the water distributer to maintain the level of liquid in the pot between predetermined limits, applying heat to the pot for baking the food therein, removing from its installed position and cleaning the detector when the food is finished baking, removing from its installed position and cleaning the distributer when the food is finished cooking.

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## ERRRATUM

For Class 128—268 see:
Patent No. 3,788,296

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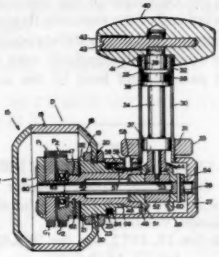
**3,788,303**

## ORTHOGONALLY DEFLECTABLE ENDOSCOPE

**Richard W. Hall, New Canaan, Conn., assignor to American Cystoscope Makers Inc., Manor, N.Y.**

**Filed Jan. 24, 1972, Ser. No. 219,988**
**Int. Cl. A61b *1/00***
**U.S. Cl. 128—4** **7 Claims**

A device for controlling movement of a plurality of cables including support means, a rotary first shaft and shaft means which are carried by the support means, the shaft means consisting of telescopically arranged second and third shafts which are rotatable about a common axis that is normal to the axis of the first shaft. The device also includes a pair of coaxial pulleys, one of the pulleys being secured to and rotatable with the second shaft and the other being secured to and rotatable with the third shaft. Each pulley is equipped with a pair of cables that are secured thereto and partly and oppositely wound thereon. Coupling means connect the first shaft to the shaft means and effect rotation of the shaft means and the pulleys in response to rotary movement of the first shaft about its axis and/or bodily movement of the first shaft about the axis of the shaft means.



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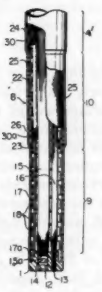
**3,788,304**

## ENDOSCOPE

**Nagashige Takahashi, Tokyo, Japan, assignor to Olympus Optical Co. Ltd., Tokyo, Japan**

**Continuation-in-part of Ser. No. 856,049, Sept. 8, 1969, abandoned. This application June 15, 1971, Ser. No. 153,341**
**Int. Cl. A61b *1/06***
**U.S. Cl. 128—6** **1 Claim**



An endoscope includes a distal end portion adapted to be inserted into a hollow portion for the inspection thereof, a controllably bendable tube connected to the distal end portion, a yieldably flexible tube connected to the controllably bendable portion, and a proximal end portion including a control housing connected to the yieldably flexible tube. An image of an object formed in the distal end portion is transmitted through an image transmitting optical system extending through the controllably bendable tube and the yieldably flexible tube to the control housing thereby permitting the thus transmitted image to be viewed through ocular means or photographed by a camera in the control housing. The controllably bendable tube is controllably bent by string means connected at its distal end to the forward end portion and extending through the controllably bendable tube and the yieldably flexible tube to the control housing where the end of the string means is connected to a control mechanism so as to be actuated thereby for bending the controllably bendable tube. The forward end part of the yieldably flexible tube is made to have a greater pliability than that of the remaining part, and the pliability of the controllably bendable tube is selected to be greater than that of the forward end of the

yieldably flexible tube, so that the distal end portion is easily inserted even into a narrow sharply bent passage having a substantially U-shape configuration with the portion thereof turned back upon itself by the angle of about 180° by virtue of the difference in the curvature of the controllably bendable tube and the forward end of the yieldably flexible tube and the remaining part thereof due to the difference in the pliability thereof when the controllably bendable tube is inserted into the narrow bent passage and bent by the actuation of the string means.

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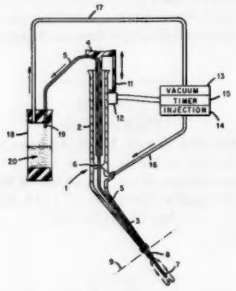
**3,788,305**
**INTRATRACHEAL SAMPLING DEVICE**
**Hans Schreiber, Oak Ridge, Tenn., assignor to The United States of America as represented by the United States Atomic Energy Commission, Washington, D.C.**
**Filed Oct. 19, 1972, Ser. No. 298,983**
**Int. Cl. A61b** *5/10*
**U.S. Cl. 128—2 F** **5 Claims**




An intratracheal sampling device comprising an inner collection tube coextensively and retractably mounted within a hollow probe for insertion within the larynx of a subject animal with the collection tube in a retracted position. Depression of a plunger mounted at the external end of the probe extends the collection tube within the animal's trachea and at the same time activates means for supplying wash fluid to the probe as well as vacuum means communicating, via a sample collection vessel, with the collection tube. Wash fluid is ejected in a jetting action through an annular clearance between the distal end of the probe and the extended collection tube. The ejected fluid, together with constained exfoliated cells from the tracheal walls, is recovered in the sample collection vessel after returning through the collection tube.

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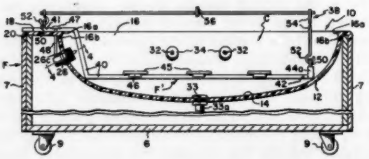
**3,788,306**
**HYDROTHERAPY BATH TUB**
**Frank A. Eberhard, 418 N. Birney St., Bay City, Mich.**
**Filed Mar. 6, 1972, Ser. No. 232,004**
**Int. Cl. A61h** *9/00*
**U.S. Cl. 128—66** **14 Claims**



A hydrotherapy bath tub unit comprising a cavity defining a continuous wall mounting a plurality of liquid emitting nozzles for introducing therapeutic liquid to the cavity, each of the nozzles being mounted for universal movement to any selected one of a plurality of different positions to direct the therapeutic liquid in any selected one of a plurality of different paths of travel.

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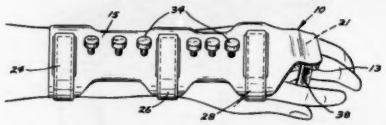
**3,788,307**
**ORTHOPEDIC SPLINT**
**Howard M. Kistner, 233 Adams Ave., Dickenson, N. Dak.**
**Filed May 1, 1972, Ser. No. 248,978**
**Int. Cl. A61f** *5/10*
**U.S. Cl. 128—77** **2 Claims**



A dorsal or anterior splint for supporting the wrist and hand joints and substantially limiting the movement thereof while permitting some effective functioning of the limb extremity. A spine-like rigid plate laminate of aluminum is surrounded by and covered on its front surface by a cushioning pad laminate of neoprene foam. A leather-like flexible skin laminate covers the back of the plate and the pad. All three of the laminae are adhesively bonded to each other. A continuous elastic loop bonded between the plate and the skin at the distal end of the splint is for holding the middle two fingers snugly against the pad. Three straps extend transversely outwardly from the skin laminate to pass around the arm, wrist and hand, respectively, and to releasably fasten back on the skin laminate to hold those body parts snugly against the pad. The spine-like plate can be deformed before applying it to the limb extremity, so that when it is so applied, it will support the arm, wrist and hand in other than mutually aligned relation where that is desirable. To apply localized but evenly distributed pressure on the limb between it and the spine-like plate, a stiff, flexible, resilient slab is adhesively bonded to the pad between it and the plate. Thumb screws are threadably mounted in the plate to bear on the slab to deform it to put localized pressure on the limb.

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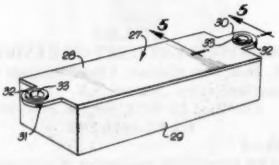
**3,788,308**
**NECK SLING PAD**
**Carl H. Simpson, 22724 Saticoy St., Canoga Park, Calif.**
**Filed Oct. 2, 1972, Ser. No. 294,152**
**Int. Cl. A61f** *5/40*
**U.S. Cl. 128—94** **4 Claims**



A neck pad for employment with a sling of the type made use of to support a broken arm has relatively large rings at respective opposite ends through which small ends of the sling are passed and then knotted so that the sling is held in position by the knot.

3,788,309
SAFETY SECURITY VEST
Mary C. Zeilman, 1167-25th Ave., N., St. Petersburg, Fla.
Filed Aug. 18, 1972, Ser. No. 281,906
Int. Cl. A61f 13/00
U.S. Cl. 128—134 3 Claims

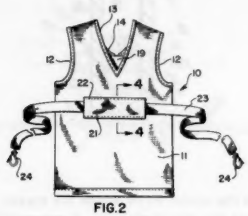


FIG.2

A garment apparatus including a generally tubular body adjustably fitted to a medical patient and having at least one restraining belt connected thereto for securing the patient to a supporting structure.

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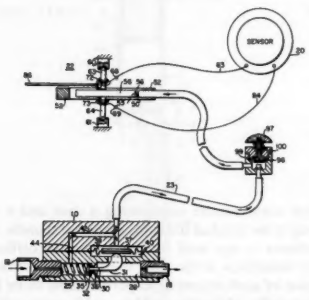
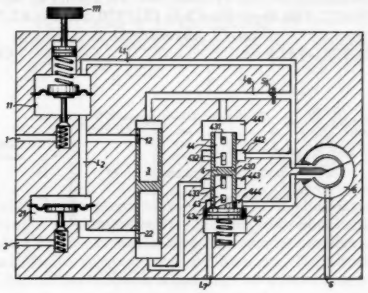
3,788,310
FLOW CONTROL APPARATUS
Lewis W. Fleischmann, Randallstown, Md., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.
Filed Mar. 25, 1970, Ser. No. 22,476
Int. Cl. A62b 7/02; F16k 31/12
U.S. Cl. 128—142 9 Claims




Oxygen gas admission into a breathing atmosphere is controlled by means of a flow control unit. A small quantity of the input oxygen gas is discharged through a discharge orifice against the edge surface of a disc forming part of an electric galvanometer movement. A partial pressure of oxygen sensor in the breathing atmosphere provides an output signal to the galvanometer movement to move the disc. Movement of the disc with respect to the discharge orifice changes the back pressure sensed at the flow control unit to govern the admission of new gas.

3,788,311
TUBULAR DIVING EQUIPMENT
Gosta H. Fahlman, Tsawwassen, British Columbia, Canada; Gunnar Lundborg, Vallingby, and Johan Eric Hayden, Westberg, Lidingo, both of Sweden, assignors to AGA Aktiebolag, Sweden
Filed Oct. 4, 1971, Ser. No. 186,258
Claims priority, application Sweden, Oct. 15, 1970, 13944/70
Int. Cl. A62b 7/02; B63c 11/14
U.S. Cl. 128—142.3 6 Claims



A tubular diving equipment for diving in water and providing the diver with a gas mixture consisting of a main gas and an auxiliary gas. Different gas mixtures may be considered as breathing gas depending on the diving depth. Said diving equipment has a manually controllable pressure regulator for the main gas and a pressure regulator for the auxiliary gas being controlled by the pressure of the main gas at the outlet of the main gas pressure regulator. The outlets on the respective pressure regulators are connected to a gas mixer chamber via a pressure equalizer. Between said mixer chamber and said pressure equalizer is an automatic control valve connected controlling the pressure of the gas mixture. An automatic correction of the mixing ratio for different depth of diving is obtained.

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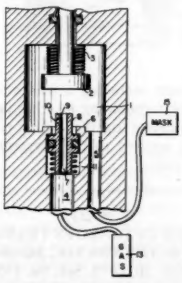
3,788,312
WARNING VALVE
Jan Erik Stellan Sandstrom, Djursholm, Sweden, assignor to AGA Aktiebolag, Sweden
Continuation of Ser. No. 94,769, Dec. 3, 1970, abandoned. This application Aug. 7, 1972, Ser. No. 278,186
Int. Cl. A62b 9/02
U.S. Cl. 128—142.3 6 Claims




A warning valve having particular use in breathing apparatus comprising a chamber with a moveable valve body

adapted to cooperate with a main valve seat in a feed line communicating with the chamber, characterized in that the feed line is connected to the chamber via on the one hand a main duct and on the other hand a bypass duct, the valve body being arranged so that in a first step it closes the main duct and in a second step it also closes the bypass duct.

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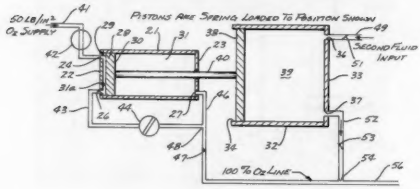
**3,788,313**
**RESPIRATOR APPARATUS**
**Leon J. Arp, Blacksburg, Va., and James M. Varnum, 428 Ash, Ames, Iowa, assignors to said Arp, by said Varnum**
**Division of Ser. No. 597,649, Nov. 29, 1966, Pat. No. 3,530,872. This application July 15, 1970, Ser. No. 62,753**
**Int. Cl. A61m** *16/00*
**U.S. Cl. 128—145.8** **7 Claims**




A respirator with a pair of cylinders having interconnected pistons. The cylinders are connected by appropriate valve means to provide a device capable of mixing two fluids.

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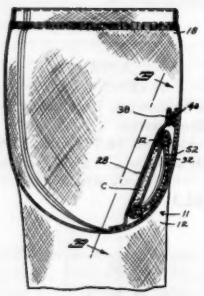
**3,788,314**
**COMBINATION ATHLETIC GARMENT**
**Dennis L. Noreen, 3250 Miller Trunk Hwy., Duluth, Minn.**
**Filed Feb. 11, 1971, Ser. No. 114,540**
**Int. Cl. A61f** *5/40*
**U.S. Cl. 128—159** **1 Claim**



An athletic garment including a pair of stretchable units forming leg portions terminating in a hip portion which terminates in a waist portion together with a releasable closable open ended pouch secured to the garment and adapted to receive a protector cup.

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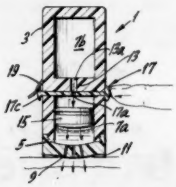
**3,788,315**
**DISPOSABLE CUTANEOUS TRANSJECTOR**
**Stephen Laurens, 148-15th 89th Ave., Jamaica, N.Y.**
**Filed Apr. 20, 1971, Ser. No. 135,727**
**Int. Cl. A61m** *5/30*
**U.S. Cl. 128—173 H** **12 Claims**

A disposable cutaneous transjecting device is formed of a cylindrically shaped housing having an open end closed by a cover securely attached to the housing. The housing forms a chamber divided by a piston plunger into a subchamber for a liquid medication and another subchamber containing means, such as a compressed gas or a spring member, for displacing the piston plunger and forcing the medication through capillary openings in the cover. Prior to use the means are restrained from displacing the piston plunger. A removable cap forms a seal for the cover. On the exterior of the housing a trigger or similar member is located for releasing the means so that the piston plunger is displaced toward the cover and the medication is ejected through the openings in the cover.



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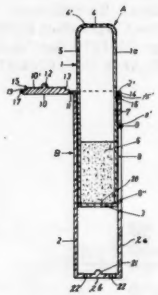
**3,788,316**
**PACKET NASAL INHALER**
**Maria Mora, via Sercognani 15, Milan, Italy**
**Filed Apr. 12, 1971, Ser. No. 133,299**
**Int. Cl. A61m** *15/08*
**U.S. Cl. 128—200** **2 Claims**



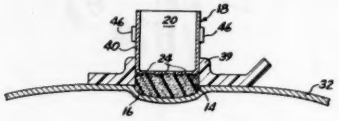
A pocket nasal inhaler comprising a case and a container for the drug to be inhaled slideably disposed therein. Said container includes a top wall having an outlet orifice formed therein for inhalation of the drug therein; said container has a cross section of such extent as to permit same to be freely axially reciprocally slideable within said case while being prevented from rotating. Said case has a cross section substantially the same as that of the container and is provided with an integrally formed cover. In one side wall of said case is a window-like opening permitting access to suitable gripping means formed on the confronting portion of the outer surface of the container whereby said container may be manipulated for movement relatively within said case. Means are provided on the case for limiting the travel of the container. Said gripping means and the associated structure are designed to permit movement of said inner container by the exertion of the thumb of the hand holding the inhaler. Said container and case are preferably fabricated from suitable plastics.

3,788,317

## POROUS ABSORBENT PAD ELECTRODE FOR USE WITH AN ELECTROCARDIOGRAPH INSTRUMENT OR THE LIKE

James B. McCormick, 40 S. Clay St., Hinsdale, Ill., assignor to Pelam, Inc., Hinsdale, Ill.

Filed Jan. 12, 1972, Ser. No. 217,192
Int. Cl. A61b 5/04
U.S. Cl. 128—2.06 E 9 Claims



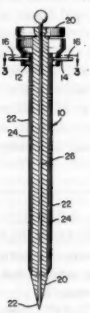

An electrode is provided for use with an instrument such as an electrocardiograph which employs a normally dry absorbant pad formed of a porous material and a cup supported above the pad, the cup being provided with passageways through which fluid may pass from the interior of the cup to the pad. In a preferred embodiment, the pad is impregnated with a material in a dry state which becomes electrically conductive when in solution with a selected liquid placed in the cup, and will expand when it absorbs the liquid to provide an intimate contact between the skin and the electrically conductive cup. Means are provided for connecting the cup to the appropriate recording instrument.

3,788,318

## EXPANDABLE CANNULAR, ESPECIALLY FOR MEDICAL PURPOSES

Sung Soo Kim, 4724 Imperial Park Dr., Fort Wayne, Ind., and Andress Dusseau, R.R. No. 1, Geneva, Ind.

Filed June 12, 1972, Ser. No. 261,793
Int. Cl. A61m 5/00
U.S. Cl. 128—214.4 14 Claims



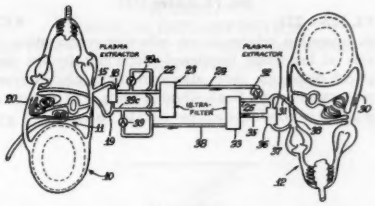

An expandable tube, referred to herein as a cannula, is formed by arranging at least one sheet of thin flexible material to form a tube while providing teeth or the like on the interengaging surfaces to permit controlled expansion of the tube by adjusting the surfaces over one another.

3,788,319

## SYSTEM FOR EXCHANGING BLOOD ULTRAFILTRATE

Deighton D. Gillette, Ames, Iowa, assignor to Iowa State University Research Foundation, Inc., Ames, Iowa

Filed July 30, 1971, Ser. No. 167,571
Int. Cl. A61m 01/02, 01/03
U.S. Cl. 128—214 B 15 Claims



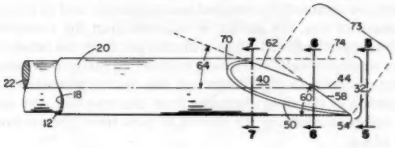

An ultrafiltrate prepared from the blood of a host is put into the venous bloodstream of a recipient while simultaneously withdrawing an ultrafiltrate from the arterial bloodstream of the recipient at approximately the same rate. The ultrafiltrate intended for the recipient is prepared by withdrawing it from the arterial system of the host while simultaneously introducing the recipient's ultrafiltrate into the host's venous system for processing. The parabiotic exchanges for both host and recipient may be done simultaneously; but if they are not, it is preferred to collect the ultrafiltrate of each in a plurality of quantities. In the latter case, the exchange is effected by introducing the ultrafiltrate in inverse order of purity in the case of the recipient and by introducing the ultrafiltrate into the host in order of purity of the quantities to promote more efficient processing by the host. Preferred apparatus for a plasma extractor and continuous ultrafilter are also disclosed.

3,788,320

## SPINAL NEEDLE

John F. Dye, Barrington, Ill., assignor to The Kendall Company, Boston, Mass.

Filed Feb. 25, 1972, Ser. No. 229,300
Int. Cl. A61m 5/32; A61b 17/34
U.S. Cl. 128—221 7 Claims




A spinal needle comprising a hollow outer needle having a stylet removably insertable within it. The stylet forward end and the outer needle forward end cooperate to provide a generally closed piercing end having two side bevel faces and a heel face. The side bevel faces each form an acute angle with the longitudinal axis of said spinal needle and intersect at an acute angle to form a straight cutting edge lying in a plane including the longitudinal axis of said spinal needle and inclined thereto. The side bevel faces also intersect the outer needle surfaces to form curved cutting edges which intersect to form a point. The heel face is inclined at an angle to the longitudinal axis of the spinal needle and joins the side bevel faces remote from the point.

3,788,321

## HYPODERMIC SYRINGE WITH IMPROVED ADHESIVE

Thomas D. Reither, Pleasant Lake, Mich., and Ralph E. Trease, Toledo, Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio

Division of Ser. No. 693,104, Dec. 26, 1967, Pat. No. 3,635,875. This application May 7, 1970, Ser. No. 35,550. The portion of the term of this patent subsequent to Jan. 18, 1989, has been disclaimed.

Int. Cl. A61m *5/32*

U.S. Cl. 128—221 8 Claims

This invention relates to an adhesive composition which contains at least one bisphenol-A/epichlorohydrin resin, a polyglycol diepoxide resin, dicyandiamide, glycidoxypropyltrimethoxysilane, and finely divided silica. The subject adhesive is useful in bonding stainless steel to glass.

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3,788,322

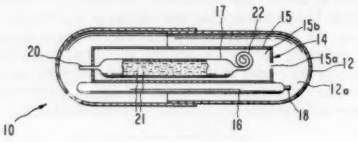
## DRUG DELIVERY DEVICE WITH MEANS FOR MAINTAINING DEVICE IN ENVIRONMENT OF USE

Alan S. Michaels, Atherton, Calif., assignor to Alza Corporation, Palo Alto, Calif.

Continuation of Ser. No. 300,674, Oct. 25, 1972, abandoned. This application Dec. 27, 1972, Ser. No. 318,799

Int. Cl. A61m *31/00*

U.S. Cl. 128—260 6 Claims




A drug delivery device for the continuous administration of a drug at a controlled rate for a prolonged time is comprised of a drug delivery device attached to a support means for maintaining the device in the environment of use. The device is comprised of a housing with an internal space that acts as a reservoir for containing a drug and a discharge means communicating between the reservoir and the exterior of the device for releasing drug therefrom. The drug delivery device and the support are optionally contained in a container, and in the environment of use, the device is released from the container and the support inflated. Drug is discharged from the reservoir by the reservoir walls collapsing to exert an internal pressure against the drug to urge it through the discharge means. On completion of the drug discharge from the reservoir, the support collapses enabling the device to pass from the environment of use.

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3,788,323

## SANITARY WEAR

Charles Portland Robinson, Old Brampton, England, assignor to Robinson & Sons Limited, Wheat Bridge Mills, Chesterfield, England

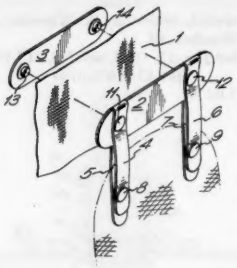
Filed Feb. 7, 1972, Ser. No. 223,938

Claims priority, application Great Britain, Mar. 2, 1971, 5826/71; Oct. 20, 1971, 48720/71

Int. Cl. A61f *13/16*

U.S. Cl. 128—291 8 Claims

A device for retaining a sanitary pad, incontinence pad or the like in position in a nether garment comprising a first element having means for attaching to the pad or the like, or to a loop or tab attached thereto, and a second element which may be press-fitted to the first element.

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3,788,324

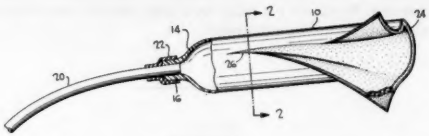
## EXTERNAL CATHETER DEVICE

Pedro K. Lim, 516 Madison Ave., Huntington, W. Va.

Filed May 5, 1972, Ser. No. 250,508

Int. Cl. A61f *5/44*

U.S. Cl. 128—295 3 Claims




A novel external catheter for use by male patients is disclosed, the catheter comprising a flexible elongated tubular sheath which defines a body portion adapted to surround the male member, the body portion terminating in a coextensive and relatively stiffer dome-shaped distal end having an orifice therethrough allowing the discharge of urine to a remote collecting location. The entire inside length of the body portion is coated with an adhesive gel foam which adhesively contacts and adheres to the underlying skin of the male member so as to maintain the catheter in place. The coating further defines a liquid-tight seal for preventing urine in the dome-shaped distal end from contacting the skin of the male member underlying the body portion. In the preferred inventive embodiment, the body portion is itself longitudinally split along the top thereof such that the catheter can accommodate male members of various sizes.

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3,788,325

## VEIN STRIPPING SURGICAL INSTRUMENT

Bjarne Hamilton Jacobsen, Birkerod, Denmark, assignor to Astra-Sjuco a division under Astra-Gruppen A/S, Roskildevej, Albertslund, Denmark

Filed Sept. 22, 1972, Ser. No. 291,192

Claims priority, application Denmark, Sept. 22, 1971, 4631/71

Int. Cl. A61b *17/00*

U.S. Cl. 128—303 R 12 Claims

The present invention relates to a surgical instrument for extracting or stripping of veins in connection with surgical treatment of varicose veins. The vein stripper comprises a string-shaped body which preferably has a uniform cross sec-

tion along the whole length thereof except from a section of reduced width positioned at least at one and preferably at both end portions of said body and spaced from the adjacent free end thereof. The vein stripper also comprises an enlarged element or a stripper head having a longitudinally and radially extending slit or slot and preferably also a central non-through end bore or depression at least at one end surface and preferably at both end surfaces for receiving part of the string-shaped body in locking engagement. The opposite end surfaces of the stripper head may be shaped differently and may for example have a convex and a concave shape, respectively.

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**3,788,326**

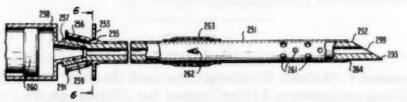
**DISTALLY PERFORATED CATHETER FOR USE IN VENTILATING SYSTEM**

**Harvey Barry Jacobs, 116-13 Vantage Hill Rd., Reston, Va.**

**Continuation-in-part of Ser. No. 59,206, July 29, 1970, Pat. No. 3,682,166. This application Aug. 3, 1972, Ser. No. 277,627**

**Int. Cl. A61m** *25/00*

**U.S. Cl. 128—305** **8 Claims**



A balloon or cuff is combined with a distally perforated soft plastic tracheal catheter over a wedge in the middle part of the catheter. The catheter is molded from non-pyrogenic thermoplastic material such as polyethylene, polytetrafluorethylene, polypropylene, poly-carbonate or other readily sterilized orientable material which is precurved at its proximate end for insertion percutaneously or is straight for insertion through the mouth and is perforated at its distal end to divert part or all of the ventilating stream passing through the catheter. If improper positioning of the axial outlet in relation to the tracheal lumen occurs, these distal perforations in the straight and precurved species permit air under pressure to be diverted from the axial outlet thereby preventing air embolisms while the air passing through the wedge blows up the balloon to press it against the trachea. These air embolisms occur and are created due only to the diffusion of air into the tissues impinged upon by the high pressure oxygenated gas flow at the axial outlet. At normal flow with proper placement no more than ten to twenty-five percent of the air passes out of the sides and this diversion maintains the desired medial axial positioning of the catheter in the tracheal lumen. This high pressure is created cyclically, the wedge diverting pressure from within the catheter to blow up the balloon under the pressure cycle of the ventilator and to permit collapse in the succeeding cycle. When air flow ceases through the wedge of the catheter, the elasticity of the balloon is such as to cause the balloon to collapse and rest against the catheter, thereby providing the function of a cuff. The cuff function of the balloon minimizes retrograde air leak during the inflation cycle.

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**3,788,327**

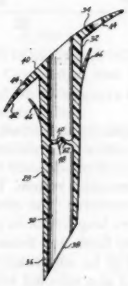
**SURGICAL IMPLANT DEVICE**

**Howard Donowitz, Box 218, R.D. No. 1, and William J. O'-Hara, 23 Hampton Dr., both of Freehold, N.J.**

**Filed Mar. 30, 1971, Ser. No. 129,384**

**Int. Cl. A61m** *27/00, 25/00*

**U.S. Cl. 128—350 R** **7 Claims**



Disclosed implant device includes a valve and conduit means for controlling the intra-occular pressure build up in a diseased eye.

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**3,788,328**

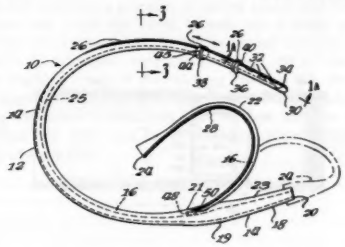
**CARDIOVASCULAR CATHETER**

**Ralph D. Alley, Loudonville, and David S. Sheridan, Argyle, both of N.Y., assignors to Sherwood Medical Industries Inc., St. Louis, Mo.**

**Continuation of Ser. No. 843,863, March 3, 1969, abandoned. This application Apr. 29, 1971, Ser. No. 138,770**

**Int. Cl. A61m** *27/00*

**U.S. Cl. 128—350 R** **4 Claims**



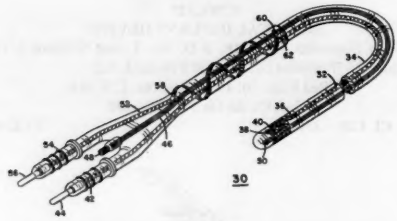
A cardiovascular catheter for use particularly in open heart surgery and related operations requiring varying forms of cardio-pulmonary bypass. The catheter has a fixed ring provided on the catheter proximal to drainage inlets and may have a sliding ring snug fit on the catheter proximal to the fixed ring for securing the catheter to a penetrated portion of the anatomy, such as the heart wall, between the two rings to assist in holding the catheter in place. In one form of the invention, the fixed ring is used alone to secure the catheter in place, for instance, during a drainage or perfusion application.

3,788,329

## BODY IMPLANTABLE LEAD

Harry G. Friedman, Plymouth, Minn., assignor to Medtronic, Inc., Minneapolis, Minn.

Filed Apr. 17, 1972, Ser. No. 244,842
Int. Cl. A61n 1/04
U.S. Cl. 128—418 13 Claims



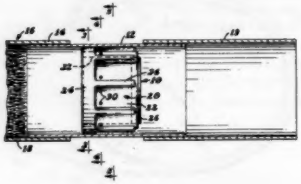
A flexible, body-implantable lead section which can be employed as an integral part of a monoplanar electrode system or alternatively as a separate means used to convert bipolar electrode system to a monopolar system. The lead section has at least one electrical conductor. The conductor is covered substantially over its entire length with an insulating material substantially inert to body fluids and tissue. The distal end of the conductor is adapted to be connected to an active electrode adapted to be located at a selected location inside the body. Indifferent electrode means are also provided. The indifferent electrode means are secured to at least a portion of the length along the surface of the inert material. In the preferred embodiment the indifferent electrode means is securely wrapped around at least a portion of the length of the inert material. This lead section with the indifferent electrode means can be employed with various configurations active electrodes for monitoring electrical activity and/or stimulating various types of tissue, including muscle and nerve tissue.

3,788,330

## FILTER MEANS

David B. Griffith, 8050 Harrison Dr., Indianapolis, Ind.

Filed Sept. 25, 1970, Ser. No. 75,381
Int. Cl. A24d 01/04; A24f 07/04, 13/06
U.S. Cl. 131—10.5 17 Claims



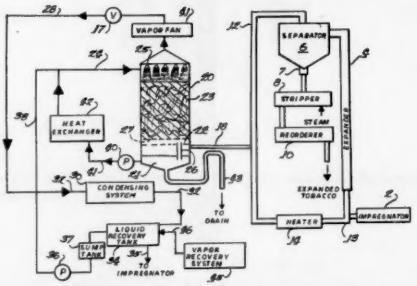
Small and transversely-extending openings in the wall of a hollow filter body carry the smoke to impinge upon an outer covering in a region thereof kept relatively cool by portions of the hollow filter body; and an effective smoke-filtering is obtained by what seems to be the combined effect of a mechanical filtering due to the forced change of path of the smoke stream and its said impingement, and a condensation of smoke vapors, the condensation and the filter residue then seeming to further filter and trap smoke particles and to yield a flavor to the smoke.

3,788,331

## SOLVENT RECOVERY IN TOBACCO TREATING PROCESS

Robert M. Neel; Clarence Robert Lloyd, and Robert C. Johnson, all of Winston-Salem, N.C., assignors to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.

Filed June 26, 1972, Ser. No. 266,416
Int. Cl. A24b 03/18
U.S. Cl. 131—143 8 Claims



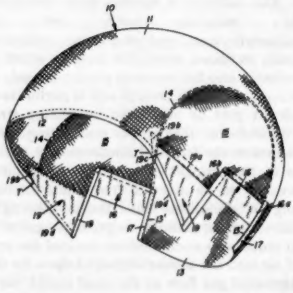

Recovery of impregnant in a process in which tobacco is impregnated with a water-immiscible organic impregnant and then subjected to a stream of gas heated to a temperature substantially above the boiling point of the organic impregnant whereby the organic impregnant is volatilized and the tobacco is expanded, with the expanded tobacco being then separated from the resulting impregnant-containing gas stream. Recovery of the organic impregnant is accomplished by passing a portion of the gas stream into a lower section of a packed tower and introducing into the upper section of said tower water at a controlled temperature to effect removal of tobacco fines in the gas stream, to cool the stream and condense a substantial proportion of the water present therein and to strip organic impregnant from process waste water introduced into the upper section of said tower. The organic impregnant is then condensed and recovered by conventional procedures for subsequent reuse.

3,788,332

## WIG FOUNDATION AND WIG

Dominic C. Abbott, Pittsburgh, Pa., and Godfrey Chen, Hong Kong, assignors to Abbott Tresses Inc., Pittsburgh, Pa.

Continuation of Ser. No. 25,446, April 3, 1970, abandoned.
This application May 11, 1972, Ser. No. 252,944
Int. Cl. A41g 5/00
U.S. Cl. 132—54 5 Claims



The wig foundation of stretch material has a center panel extending from forehead back over the crown of the head and

terminating in a depending nape portion. A side panel of semicircular-like shape is attached to each edge of the center panel and two offset elongated elastic members offset at their adjacent ends are attached to the bottom edge of the side panels and ear slots are formed at each side with stiffener members along the forward and rear edges of the ear slots. A weft of hair is attached underneath and on top of the forehead edge of the center panel. A weft is attached in a spiral manner in the crown area and down to the forehead end. Groups of wefts are attached across the back of the foundation below the crown area and from side edge to side edge with some turned under a short amount at their ends. A group of wefts are also attached next above the nape portion which also has wefts attached extending from side edge to side edge.

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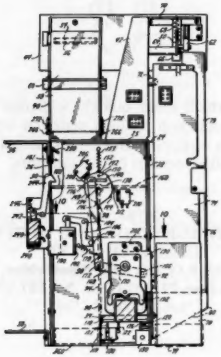
**3,788,333**

## MONEY-HANDLING DEVICE WITH PIVOTAL ESCROW PLATFORM

**Raymond Arthur Johnson, Hot Springs, Ark., assignor to U. M. C. Industries, Inc., New York, N.Y.**

**Filed Aug. 25, 1972, Ser. No. 283,733**
**Int. Cl. G07d** *1/04*
**U.S. Cl. 133—2** **7 Claims**



A money-handling device has a platform which is rotatably mounted within a chamber and which receives bills that issue from a currency validator; and that platform holds those bills in escrow — responding to a vend signal to rotate in one direction to transfer bills thereon to a passage leading to a cash box, and responding to a cancel signal to rotate in the opposite direction to transfer bills thereon to a passage leading to a bill-return receptacle. Both the chamber and the platform are longer and much wider than any bill which can issue from the currency validator; and the walls of the chamber are vertical and are smooth and free of obstructions, and the upper surface of the platform is smooth and free of obstructions. As a result, that platform can receive bills and readily transfer them to the passage leading to the cash box or to the passage leading to the bill-return receptacle even if those bills are wet, torn, folded, split, wrinkled, rolled or otherwise difficult to transfer. One edge of that platform is spaced a short distance from the adjacent surface of that chamber, and a deflector overlies the resulting gap. If any bill that issues from the currency validator tends to approach and enter that gap, the deflector will intercept that bill and will keep it from entering and sticking in that gap. The bill-return receptacle is movably mounted within the passage which leads to that bill-return receptacle; and a gap is provided between one side of that bill-return receptacle and the adjacent surface of that passage to facilitate ready movement of that bill-return receptacle relative to that passage. A deflector is mounted within that passage so it overlies that gap; and that deflector will keep bills, which the platform transfers to that passage, from entering and sticking in that gap. The bill-return receptacle and a coin-return cup are both mounted adjacent an opening in the money-handling device, and that bill-return receptacle overlies that coin-return cup. Coins can enter that coin-return cup regardless of the position of the bill-return receptacle; but coins can be removed from that coin-return cup only when that bill-return receptacle is in or close to its normal bill-receiving position, and bills can be removed from that bill-return receptacle only when that bill-return receptacle in in or close to its moved bill-returning position. A motor and connecting linkage selectively rotate the platform in the said one direction or the other; and interlocks are provided to prevent movement of the bill-return receptacle out of its normal bill-receiving position while the motor is energized and to disable the motor whenever that bill-return receptacle is out of that position.

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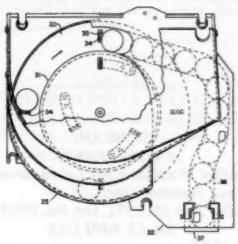
**3,788,334**

## ROTARY DISK COIN DISPENSER WITH SPRING TABS

**Ignatius B. Saraceno, Cambridge, and Gary R. Wegmiller, New Concord, both of Ohio, assignors to The National Cash Register Company, Dayton, Ohio**

**Filed Aug. 5, 1971, Ser. No. 169,266**
**Int. Cl. G07d** *1/02*
**U.S. Cl. 133—4 R** **3 Claims**



A coin dispenser which includes a rotating disc for transporting coins from the supply area to a stacking chute. The rotating disc includes a plurality of spring tabs which function to engage and hold the coins loosely on a ledge portion located on the rotating disc. As the coins are transported by the tabs to the stacking chute, the coins will roll off the ledge into the stacking chute. If the stacking chute is full, the coins upon engaging the coins in the chute, will deflect the tabs, thus releasing the coins so that they will fall back into the supply area. Thus the disc can be constantly rotated while the stacking chute is full.

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**3,788,335**

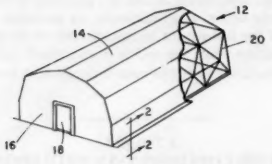
## ANCHOR MEANS FOR PORTABLE BUILDING STRUCTURE

**Richard J. Hemmelsbach, Spring Lake, Mich., assignor to Space Age Industries, Inc., West Olive, Mich.**

**Filed Nov. 9, 1971, Ser. No. 197,094**
**Int. Cl. E04b** *1/347*
**U.S. Cl. 135—1 R** **11 Claims**

A building construction having a geodetic type metal frame and a cover of flexible plastic sheet material, the frame and the cover both being secured to the ground through an elongated plate and anchor rods which are driven through the

plate in close relationship therewith into the ground at an angle to the vertical. One group of anchor rods is secured to the lower end of the frame members and another group of anchor rods is secured to the lower end of the cover through an adjustable resilient biasing means which permits expansion and contraction of the cover with temperature changes while maintaining tension on the cover. The elongated plate is




formed by angle iron and inverted with the first group of anchor rods driven through one side of the plate and the second group of anchor rods driven through the other side of the plate so that the rods are crossed with respect to each other. The anchor rods bear against the elongated plate so that the plurality of anchor rods hold the plate down tightly to the ground.

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**3,788,336**

## TENT STAKE

**William J. Steffes, Wichita, Kans., assignor to The Coleman Company, Inc., Wichita, Kans.**

**Filed July 28, 1971, Ser. No. 166,830**

**Int. Cl. A45f *1/16***

**U.S. Cl. 135—15 PE** **9 Claims**

A tent stake is provided which may be advantageously molded integrally from plastic and which has good strength yet relatively small cross sectional area. The stake includes an elongated body formed by three longitudinally extending ribs which are spaced about 120° apart to provide a generally Y-shaped cross section. The ribs taper at one end of the body to form a ground-entering end, and the driving end of the stake terminates in a generally convex head. A hook is formed on one of the longitudinally extending ribs and extends angularly outwardly from the head toward the ground-entering end of the stake. If desired, a second hook spaced longitudinally from the first hook may be provided on the same longitudinally extending rib. The longitudinally extending rib from which the hook extends is strengthened by an outer end portion which extends perpendicularly to the outwardly extending portion of the rib, and the driving portion of the stake may be reinforced by reinforcing ribs which extend between the head and the longitudinally extending ribs.

**3,788,337**

## APPARATUS AND PROCESS FOR MIXING COMPONENTS WHICH REACT QUICKLY WITH ONE ANOTHER, MORE ESPECIALLY FOR THE PRODUCTION OF FOAM MATERIALS

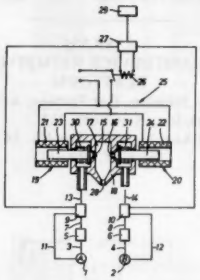
**Karl Breer, Cologne, Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Germany**

**Continuation-in-part of Ser. No. 14,910, Feb. 27, 1970. This application Dec. 2, 1971, Ser. No. 204,319**

**Claims priority, application Germany, Mar. 13, 1969, P 19 12 734.5**

**Int. Cl. B28b *13/00*; F16k *11/24***

**U.S. Cl. 137—1** **19 Claims**



Components which react quickly with one another, are mixed for the production of foam materials within a mixing chamber which is equipped with simultaneously acting electromagnetic actuating devices for the injectors.

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**3,788,338**

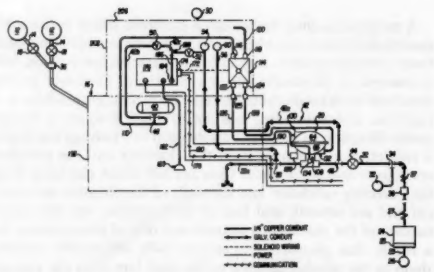
## VACUUM SEWAGE CONVEYING WITH VACUUM OPERATED VALVE

**Bland Calvin Burns, P.O. Box 254, Woodbridge, Va.**

**Filed June 29, 1971, Ser. No. 157,936**

**Int. Cl. E03d *1/00***

**U.S. Cl. 137—1** **28 Claims**



A method and apparatus for conveying sewage by vacuum induced plug flow wherein sewage is drawn from a sewage collecting region into a vacuum line conduit, through a vacuum operated valve in that conduit, and is conveyed toward the source of vacuum by vacuum induced plug flow involving the interposition of volumes of air between plugs of sewage. A control zone in an operator portion of the vacuum valve is controllable by a low pressure reservoir for opening the valve. The reservoir is maintained at a low pressure through a vacuum tap conduit communicable with the reservoir and the vacuum line conduit.

The sewage collecting region may be an underground collecting tank which contains, in a dry compartment, equipment for controlling operation of the vacuum valve which may be located outside the collecting region in a separate housing just below grade. Electrical power used at the collecting region may be supplied solely from a central panel through cable laid in a trench along the vacuum line conduit.

A rigid pipe assembly in the collecting tank is connected several feet above the tank bottom, but below grade, to a pipe assembly of the vacuum valve, and the orientation may be such as to permit disconnection of pipes at the vacuum valve without causing leakage in the region where workmen must stand.

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**3,788,339**

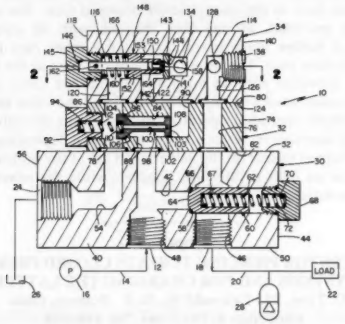
**FLUID CONTROLLING**

**James M. Denker, Scituate, Mass., assignor to Nutron Corporation, Hingham, Mass.**

**Continuation-in-part of Ser. No. 230,561, March 1, 1972. This application Aug. 18, 1972, Ser. No. 284,966**

**Int. Cl. G05d** *16/10*

**U.S. Cl. 137—115** **18 Claims**



A fluid control circuit comprising a controller including a control element movable between first and second positions and operative for generating an output fluid signal dependent on the position of the control element, and first and second sensors arranged for sensing a pilot pressure, one of the sensors being operable for causing the control element to assume its second position when the sensed pilot pressure exceeds a predetermined upper level, and the other of the sensors being operable for causing the control element to assume its first position when the pilot pressure drops below a predetermined lower level.

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**3,788,340**

**COOLING TOWER WATER CONTROL SYSTEM**

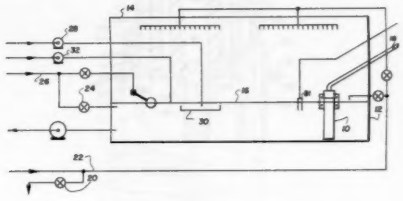
**Richard P. O'Leary, 15 Mariam Dr., Bellvale, N.Y., and Charles F. Kapr, 212 Woodland Rd., New Milford, N.J.**

**Filed June 28, 1971, Ser. No. 157,220**

**Int. Cl. G05d** *11/08;* **H01h** *36/02*

**U.S. Cl. 137—93** **10 Claims**

A cooling tower water control system operated by means of a ring float, a ring magnet fastened thereto, four magnetic reed switches enclosed by four individual tubes mounted in a parallel direction inside an enclosing tube, said ring magnet sliding freely along and around the enclosing tube in a vertical direction. The system is enclosed in a cylindrical case, closed at the top by a removable cap supporting electrical wires therethrough and having an orifice on the side wall and close to the bottom allowing sump water to enter and leave freely. The necessary support for mounting the system to the water sump is attached to the outer surface of the cylindrical case. Interlocking relays, A.C. valves, pumps, hydraulic valves, switches, solenoid valves, drivers and neon indicators are also basic parts of the control system.



The invention automatically and accurately controls the water level in the sump and the concentration of treating chemicals added thereto through a three-phase operation cycle. Said cycle comprises evaporation of a predetermined amount of water through the cooling action of the tower, flushing or blow-down of another predetermined amount of water along with used treatment chemicals, and replenishing of the sump water and treating chemicals to their initial level and concentrations respectively.

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**3,788,341**

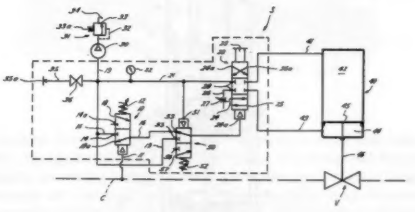
**PRESSURE RESPONSIVE VALVE SYSTEM**

**Lawrence P. Athy, Jr.; Sandy S. Rushing, Jr., and Gordon B. Nicholson, III, all of Houston, Tex., assignors to Southwestern Manufacturing Company**

**Filed May 4, 1972, Ser. No. 250,215**

**Int. Cl. F16k** *31/12*

**U.S. Cl. 137—209** **10 Claims**



A new and improved system for controlling the operation of a valve, particularly adapted for use in remote locations such as remote pipeline block valves and the like.

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**3,788,342**

**VACUUM BREAKER VALVE**

**Kenneth A. Milette, Laguna Beach; Tim M. Uyeda, South San Gabriel, and Elias D. Quintana, Huntington Beach, all of Calif., assignors to International Telephone and Telegraph Corporation, New York, N.Y.**

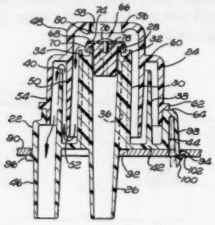
**Filed Feb. 14, 1973, Ser. No. 332,371**

**Int. Cl. F16k** *45/00*

**U.S. Cl. 137—218** **10 Claims**

A vacuum breaker valve for use with a toilet such as employed in recreational vehicles. The valve comprises a two-

piece plastic valve housing comprising a base member and a cap member sealed to one another. The base member includes a water inlet pipe and an outlet port. A valve element rests on the top of the water inlet pipe. The cap member has an atmospheric opening above the valve element. The base and cap members are formed with cylindrical walls positioned in nested coaxial relationship which define a tortuous path between the inlet and outlet port, which is greater than the actual vertical height of the valve.



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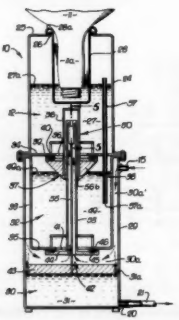
**3,788,343**

## LIQUID DISPENSING APPARATUS

**Samuel W. Neidorf, Encino, and Howard K. Arnold, Venice, both of Calif., assignors to Bar-O-Matic Sales Co., Van Nuys, Calif.**

**Filed July 3, 1972, Ser. No. 271,261**
**Int. Cl. B65d *83/14***
**U.S. Cl. 137—209** **17 Claims**



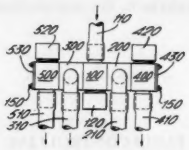
A liquid dispensing apparatus receives liquid at atmospheric or other reservoir pressure and dispenses the liquid at a higher pressure established by a supplied gas. The apparatus includes an inlet reservoir, a delivery chamber in which liquid is maintained under pressure, and a pressurizing chamber. As liquid is dispensed from the delivery chamber, appropriate valves cooperate repetitively to feed a quantum of liquid from the reservoir to the pressurizing chamber, to pressurize this quantum of liquid, and to provide the pressurized liquid to the delivery chamber to restore the level therein. This cyclic pressure amplification is powered only by the supplied gas pressure; no pump is used.

**3,788,344**

## STACKED VALVE SYSTEM

**Gerhard J. Dyck, Saskatoon, Saskatchewan, Canada, assignor to Dyckes Sprinkler Co. Ltd., Saskatoon, Saskatchewan, Canada**

**Filed July 7, 1972, Ser. No. 269,739**
**Claims priority, application Canada, Aug. 18, 1971, 120828**
**Int. Cl. F17d *1/00*; F16k *11/00***
**U.S. Cl. 137—271** **9 Claims**



A stacked valve system is herein provided. It includes a plurality of plastic valve bodies interconnected together. Each plastic valve body includes a central bore, adapted, when a plurality of valve bodies are so interconnected together, to provide a straight throughflow internal valve conduit chamber. A second bore is provided at right angles to the central bore, such second bore extending through the valve body from one face to the diametrically opposed face. The second bore is provided, at one face thereof, with an externally threaded hollow valve barrel, and at the other face thereof with a hollow post. The internal face of the bore at the hollow post is provided with an integrally premolded valve seat. A valve is associated with the valve barrel and the valve includes an internally threaded operator threaded onto the valve barrel. The operator includes a valve stem and a depending valve head adapted to seat on the valve seat. One of the hollow posts serves as an inlet to the flow conduit, while the other posts serve as outlets.

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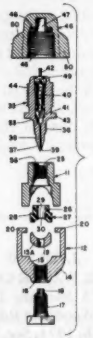
**3,788,345**

## DEVICES FOR PIERCING TUBES IN CLOSED PRESSURE SYSTEMS AND FOR CHARGING THE LATTER

**Natale G. Tura, 343 Griswold St., N. E., Warren, Ohio**

**Filed Aug. 4, 1971, Ser. No. 168,958**
**Int. Cl. B23b *41/08*; F16e *41/04***
**U.S. Cl. 137—318** **5 Claims**



A device which may not only be used to pierce a tube in a closed pressure system for the purpose of checking or recharging the pressure therein, but which may be left on the tube to seal the pierced hole and may be reused in the future for again checking the pressure or recharging the system.

The device comprises a two part body, one part having ribs and the other having ledges to receive the ribs. The parts are held assembled with the tube by a simple set screw threaded through one part and engageable with the tube to draw the parts into interlocking relation. An injection needle is threaded through the other part to pierce the tube, such other part carrying a seal to prevent loss of pressure through the pierced opening. The piercing needle incorporates a valve, like a tire valve, so that the system may be checked or charged. A cap is threaded on the piercing needle and is used to thread the latter for piercing the tube.

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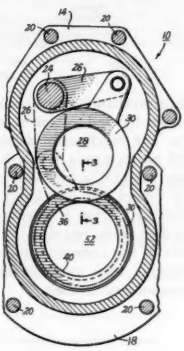
**3,788,346**
**FLANGELESS VALVE**
**Thomas W. Fitzgerald, Westfield, N.J., assignor to Everlasting Valve Company, Cranford, N.J.**
**Filed Oct. 27, 1971, Ser. No. 192,979**
**Int. Cl. F16k** *29/00*
**U.S. Cl. 137—330** **1 Claim**



The application for patent discloses a quick opening valve which provides a seat under sealing pressure which is exerted by an elastic material disposed between the valve body and the seal. The pressure is such that the shearing action of the gate against the spring-backed seat prevents any build up of carbon particles and the like which would otherwise impair the tight closure which is required in numerous valve applications. The spring action of the elastic material is provided by allowing a portion of the compressed material to vent out a narrow annular shaped opening between the seat and the valve body. A modified valve structure provides a gate having a rotatable member which on valve closure is turned in one direction within a non-rotating ring to assure even wear on the sealing surface.

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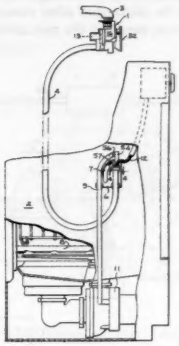
**3,788,347**
**SINGLE HOSE COUPLING SYSTEM**
**Lauren W. Guth, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.**
**Filed July 27, 1972, Ser. No. 275,727**
**Int. Cl. B65h** *75/36*
**U.S. Cl. 137—355.17** **2 Claims**

By the present invention there is provided a system for connecting a sequentially controlled washing machine to a faucet supplying liquid under line pressure, including a coupling attachable to the faucet and a multipassageway conduit connecting the coupling to the machine. A solenoid controlled water valve is encapsulated in the housing between the line pressure faucet inlet area and an outlet area communicating with a passageway in the conduit for introducing water at flow pressure to the washing machine only when the solenoid controlled water valve is energized. The electrical wires necessary for energizing the solenoid valve at predetermined times in the machine cycle are brought to the solenoid from the machine



sequence control system through another passageway in the conduit. Effluent from the washing machine is directed through still another passageway in the conduit and discharged through an appropriate passageway in the housing.

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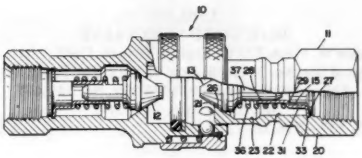
**3,788,348**
**VALVE GUIDE**
**Kenneth R. Johnson, Minneapolis, Minn., assignor to Parker-Hannifin Corporation, Cleveland, Ohio**
**Filed Nov. 3, 1971, Ser. No. 195,141**
**Int. Cl. F16k** *15/02*
**U.S. Cl. 137—542** **2 Claims**



A valve device having a guide for a reciprocating valve element, the guide having a tubular portion of substantial length slidably receiving a stem on the valve element, radial flange portions at one end of the tubular portion, and circumferentially spaced fingers extending generally axially from said flange portions, the fingers having radially outwardly extending portions sprung into a groove around a bore in which the guide is mounted, and a spring over the tubular portion engaging the flange portions and valve element for urging the latter to closed position, the fingers between said flange portions and said extending portions having an outside diameter substantially the same as the outside diameter of said spring.

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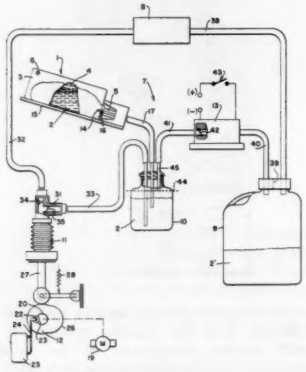
**3,788,349**
**LIQUID CIRCULATION APPARATUS**
**Robert J. Meyer, and Harry L. Westacott, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**
**Filed June 26, 1972, Ser. No. 266,168**
**Int. Cl. G03d** *3/02*
**U.S. Cl. 137—565** **6 Claims**

Liquid circulation apparatus is adapted to furnish metered quantities of photographic processing solution to a photo-

graphic material processing station, on a demand basis, and to accumulate spent solution emptying from the processing station in a waste container. In operation, the metered solution quantities are drawn from a fixed volume reservoir and fed to the processing station by means of a solution reservoir bellows and cam pump assembly. A processing solution storage bag of the kind which is to be discarded after completed removal of the processing solution, supplies the processing solution to the



fixed volume reservoir for use at the processing station. For ecology purposes, any unused processing solution remaining in the solution supply bag is removed, prior to discarding such bag, by a scavenging pump which draws the unused solution into the fixed volume reservoir. If the amount of processing solution in the fixed volume reservoir exceeds a given quantity, then the excess solution will be fed by the scavenging pump from the fixed volume reservoir into the waste container.

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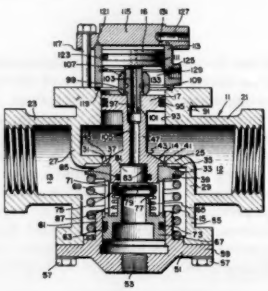
**3,788,350**

**BLOCK AND VENT VALVE**

**Benjamin W. West, 237 La Espiral, Orinda, Calif.**

**Division of Ser. No. 151,466, June 9, 1971, Pat. No. 3,741,245.**
**This application Apr. 9, 1973, Ser. No. 349,457**
**Int. Cl. F15b** *11/08, 13/42*
**U.S. Cl. 137—596.18** **1 Claim**



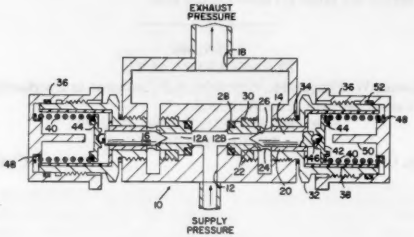
A valve assembly is described of the so-called block and vent type wherein the valve is normally closed with the downstream side vented. When a pilot pressure is applied, it first closes the vent and then opens the valve partially. On application of a second pilot signal from another source or from a suitable time delay network, the valve opens fully. On release of the pilot pressures, the valve closes first and then opens the downstream vent.

**3,788,351**

**VALVE REFERENCE SYSTEM FOR HIGH ACCELERATION ENVIRONMENT**

**Clement L. Conklin, Jr., Windermere, Fla., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Nov. 21, 1972, Ser. No. 308,616**
**Int. Cl. F16k** *51/00, 17/06*
**U.S. Cl. 137—512.1** **1 Claim**




A valve reference mechanism for regulating a missile fluid or gas system that is subjected to high acceleration and vibration environments. The mechanism maintains the system at non-environmental performance levels by using two valves mounted in opposed relation to control the supply pressure inlet. When inertia forces are developed by environmental causes a compensating motion is developed which tends to close one valve orifice while opening the opposed valve orifice. The net effect of the compensating displacements is to keep the total passage area constant and reduce pressure change due to environmental causes.

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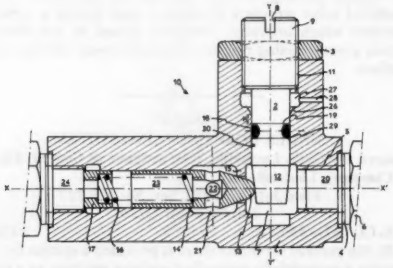
**3,788,352**

**FLOW LIMITER**

**Jean-Pierre Ane, Jouy-en-Josas; Jean-Paul Teillard, Malakoff, and Emile Quere, Charenton, all of France, assignors to Societe Nationale Industrielle Aerospatiale, Paris, France**

**Filed Nov. 6, 1972, Ser. No. 303,836**
**Claims priority, application France, Nov. 12, 1971, 7140663**
**Int. Cl. F16k** *17/00*
**U.S. Cl. 137—523** **6 Claims**



Precision flow limiter in which a single hydraulic conduit contains a non-return valve urged against its seat by a spring, while an adjusting screw having a tapering ramp is adapted to

cooperate with an axial abutment of said valve whereby to space the latter from its seat as required and accurately adjust the throttled flow.

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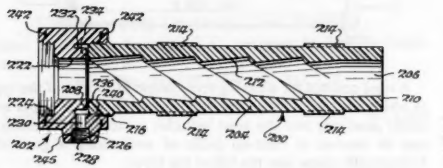
3,788,353
NOZZLE
Maurice C. Breunsbach, Hamburg, N.Y., assignor to Spirolet Corporation, North Tonawanda, N.Y.
Division of Ser. No. 7,747, Feb. 2, 1970, Pat. No. 3,692,243. This application Apr. 24, 1972, Ser. No. 247,207
Int. Cl. F16k *19/00*
U.S. Cl. 137—604 6 Claims



An elongated hollow body formed of a resiliently yieldable material having a bore therethrough. A thread formation of helical configuration is formed in the bore and the bore tapers gradually toward its outlet end. Passages formed in the inlet end of the nozzle are variable in size to control the rate of liquid flow into the bore.

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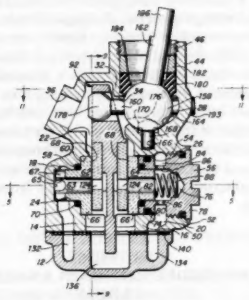
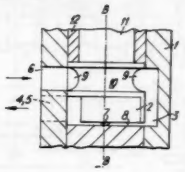
3,788,354
SINGLE HANDLE WATER MIXING VALVE
Paul C. Symmons, King Ceaser Road, Duxbury, Mass.
Filed May 30, 1972, Ser. No. 257,880
Int. Cl. F16k *11/00*
U.S. Cl. 137—625.4 32 Claims



The invention is an improvement in water mixing valves and in a preferred embodiment it features ceramic valve members of unique design that are mounted so as to minimize damage by torsional forces or by engagement with other mechanical parts.

3,788,355
VALVE
Derek John Wood, Harrogate, England, assignor to Imperial Chemical Industries Limited, London, England
Filed Sept. 24, 1971, Ser. No. 183,459
Claims priority, application Great Britain, Oct. 19, 1970, 49,448/70
Int. Cl. F16k *11/00*
U.S. Cl. 137—625.11 8 Claims



A valve is provided having an inlet and a number of outlets any one of the outlets being closable while allowing flow through the others, there being no stagnant zones in the valve when liquid passes through all outlets.

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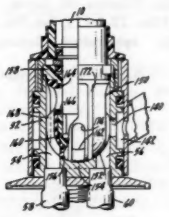
3,788,356
FAUCET CONSTRUCTION
Alfred M. Moen, 25 Lakeview Drive, Grafton, Ohio
Division of Ser. No. 147,327, May 27, 1971. This application Aug. 3, 1972, Ser. No. 277,734
Int. Cl. F16k *11/02*
U.S. Cl. 137—625.17 7 Claims



A single handle mixing faucet has a hollow stem positioned within a sleeve. The sleeve has a pair of water inlet openings and at least one discharge opening and the stem is reciprocal and rotatable relative to the sleeve to control the volume and temperature of water discharged from the sleeve. The sleeve is positioned within a retainer having bottom inlet openings with the exterior of the sleeve and the interior of the retainer cooperating to define passages from the retainer inlet openings to the sleeve inlets. A handle for the mixing faucet includes a cap and a lever, with the cap being attached to a stem and a portion of the lever being positioned within the cap and interlocked with the sleeve.

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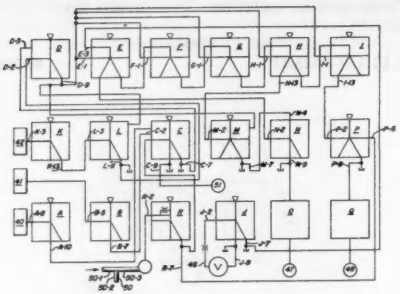
3,788,357
FLUIDIC DRIVER ALERTNESS SYSTEM
Horace B. Welk, Jr., Churchville, Pa., assignor to Casco Products Corporation, Bridgeport, Conn.
Filed Mar. 31, 1972, Ser. No. 240,151
Int. Cl. F15c *1/12*
U.S. Cl. 137—805 5 Claims

A flueric computer operates on specified fluidic input signals to produce output signals which will, in turn, activate

an audible warning sound, then a vehicle braking action if predetermined conditions are not satisfied. The computer uses



all fluidic digital logic and is comprised of an oscillator, multiple binary counter stages and the necessary digital logic elements to perform its function.

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**3,788,358**

**DEVICE FOR MOUNTING A BLADDER IN AN ACCUMULATOR**

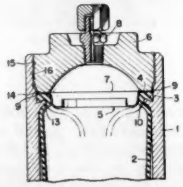
**Hiroaki Taki, Shimizu, Japan, assignor to Nippon Accumulator Kabushiki Kaisha, Shimizu-shi, Japan**

**Filed Mar. 22, 1972, Ser. No. 236,927**

**Claims priority, application Japan, Mar. 30, 1971, 46/22685**

**Int. Cl. F16l** *55/04*

**U.S. Cl. 138—30** **1 Claim**



On an upper surface of a flange portion formed along an outer periphery of a mouth of a bladder, is disposed an antifriction washer portion of a centering ring member, on which antifriction washer portion is placed a lid for an outer shell, and said flange portion is urged against said outer shell by turning said lid. The arrangement is such that no torque is imposed to the flange portion even when said lid is turned. An arcuated portion is formed in the centering ring member, so that the bend portion of the bladder may be deformed along this arcuated portion, and thereby locally sharp bending of the bladder can be avoided. Then, a slight gap clearance formed between the inner surface of the outer shell and the outer peripheral surface of the lid is tightly sealed by said flange portion.

**3,788,359**

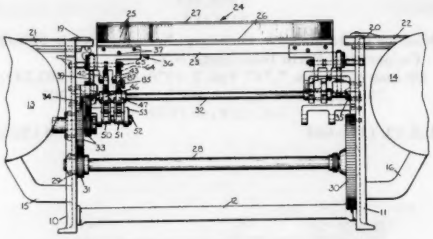
**LOOM REED MOTION**

**Richard L. Volpe, Hopedale, Mass., assignor to Rockwell International Corporation, Pittsburgh, Pa.**

**Filed July 10, 1972, Ser. No. 269,987**

**Int. Cl. D03d** *49/60, 39/22*

**U.S. Cl. 139—26** **7 Claims**



A reed control for weaving terry fabric in a loom of the type in which the lay and reed are reciprocated between upper and lower positions and the reed includes a cam face whereby it can be moved to beat-up picks of weft along a generally horizontally plane into the fell of the fabric.

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**3,788,360**

**WEFT NEEDLE HEAD OF SHUTTLELESS LOOM**

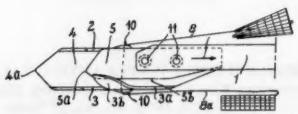
**Maxime Guallo, Bourgoin-Jallieu, France, assignor to Ateliers Diedericks, Bourgoin-Jallieu, France**

**Filed Mar. 31, 1972, Ser. No. 240,077**

**Claims priority, application France, Apr. 5, 1971, 71.12626**

**Int. Cl. D03d** *47/20*

**U.S. Cl. 139—122 N** **6 Claims**



This head of weft-yarn introducing needle for a shuttleless loom, which is adapted to introduce the yarn into the shed by developing a yarn loop having one end retained and the other end released, comprises a parallelipipedic tubular body of substantially rectangular cross-sectional configuration with horizontal walls formed with notches ; these notches have their bottom lined preferably with a ceramic material with their two pointed ends slightly recessed in relation to the notch bottom inlets ; on the feed side, the horizontal wall of the head adjacent the free end of the yarn loop is skew to the direction of travel and the wall portion bounded by the edge of said notch and the rear edge form together an upswept curved tongue terminating at a certain distance from the contiguous vertical wall.

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**3,788,361**

**SELVAGE NEEDLE MOTION IN A NARROW WARE LOOM**

**Clarence R. Kronoff, Worcester, and Donald F. Hayden, North Brookfield, both of Mass., assignors to Crompton & Knowles Corporation, Worcester, Mass.**

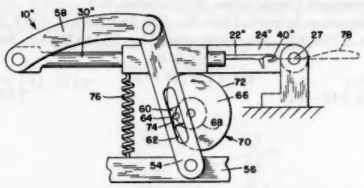
**Filed June 21, 1971, Ser. No. 154,968**

**Int. Cl. D03d** *47/24*

**U.S. Cl. 139—124** **8 Claims**

A drive mechanism for the selvage knitting needle in a narrow ware loom which includes means for guiding the needle so

that it always intersects an axis coincident with the fell line of the cloth and means to reciprocate the needle forwardly and




rearwardly of the fell while simultaneously causing the hook of the needle to move vertically.

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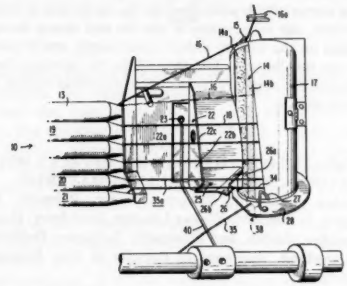
**3,788,362**

## AUTOMATIC LOOM FILLING WINDER

**James T. Blakely, Laurens, S.C., assignor to Blakely Industries, Greenville, S.C.**

**Filed Dec. 21, 1972, Ser. No. 317,152**
**Int. Cl. D03d** *45/26, 45/02*
**U.S. Cl. 139—247** **9 Claims**



An assemblage of several parts in the nature of guides or restrainers for yarn ends is attached to the magazine section of the automatic loom filling winder on a typical fly shuttle loom. These attachment parts greatly increase the efficiency of operation of the magazine section particularly at the critical time of transfer of fully wound bobbins from the magazine into the shuttle. The tendency for very fine filling yarns of the types possessing low coefficients of friction to move improperly across the yarn ends drum and to become entangled is successfully eliminated by the invention. Additionally, at the critical transfer time, each yarn end is directed to the center or region of maximum gripping pressure of a clamping means which must hold the yarn ends securely at the time of transfer. The invention in no way interferes with the normal cycle of operation of the automatic loom filling winder and, in fact, assists this cycle of operation.

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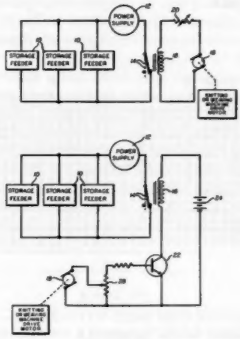
**3,788,363**

## CONTROL MEANS FOR TEXTILE PRODUCING MACHINES

**Edward M. Tellerman, Woodmere, N.Y., assignor to Stop-Motion Devices Corporation, Plainview, N.Y.**

**Continuation-in-part of Ser. No. 169,205, Aug. 5, 1971, Pat. No. 3,710,595. This application Jan. 12, 1973, Ser. No. 323,310. The portion of the term of this patent subsequent to Jan. 16, 1990, has been disclaimed.**
**Int. Cl. D03d** *51/00*
**U.S. Cl. 139—336** **7 Claims**

The disclosure relates to means for controlling the operation of components associated with a knitting or weaving machine, in response to the motion or absence of motion thereof. The components particularly, though illustratively, described are storage feeders associated with knitting or weaving machines whose operation is controlled so that their storage drums are prevented from being rotated when the knitting or weaving machine is not in operation. Generator




means or other electrical means responsive to the condition of the knitting or weaving machine energizes a solenoid which closes a normally open switch separating the storage feeder from its power supply. When the knitting or weaving machine is out of operation, the solenoid is de-energized and the normally open switch prevents power from being supplied to the storage feeder.

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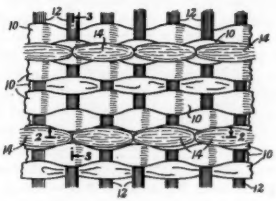
**3,788,364**

## TUFTED PILE FABRICS AND BACKINGS THEREFOR

**Henry D. Dawbarn, Waynesboro, Va., assignor to Thiokol Chemical Corporation, Bristol, Pa.**

**Division of Ser. No. 884,083, Dec. 11, 1969, abandoned, and a continuation-in-part of Ser. No. 487,402, Sept. 15, 1965, Continuation of Ser. No. 840,594, June 30, 1969. This application Sept. 13, 1971, Ser. No. 179,680**
**Int. Cl. D03d** *15/00;* **D05c** *17/02*
**U.S. Cl. 139—420 R** **7 Claims**

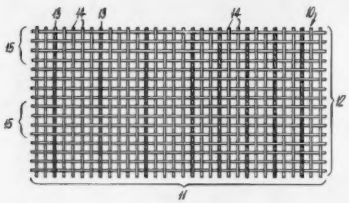


A primary backing adapted to be used in making tufted pile fabrics and woven from polyolefin yarns, the warp yarns being closely spaced flat ribbon monofilaments of substantially rectangular cross-section and the weft yarns being widely spaced relatively round multifilament or monofilament yarns. The warp yarns are crowded together to give a spacing index of 1.3 to 1.6. The weft or filling yarns are preferably untwisted multifilament yarns with a spacing index of 0.15 to 0.45. The tufted backing is also claimed.

## 3,788,365
## NARROW ELASTIC FABRIC FOR USE AS WAISTBAND IN ARTICLES OF APPAREL

Roger G. Campbell, Sr.; Richard E. Goff, Jr., and Joseph A. Priestley, all of Barrington, R.I., assignors to Johnson & Johnson, New Brunswick, N.J.

Filed May 26, 1971, Ser. No. 146,938
Int. Cl. D03d *15/08*; A41d *1/06*
U.S. Cl. 139—421 12 Claims

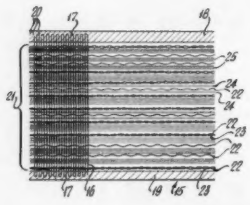


A narrow elastic fabric for use as a waistband in an article of apparel comprising a set of warp yarns running in the direction of the length of the fabric interwoven with a set of filling yarns running in the direction of the width of the fabric. From 10 to 50 percent of the number of yarns in the warp set being elastic yarns with the remaining yarns nonelastic. The elastic yarns having a spandex core initially wrapped with a settable yarn. The warp and filling yarns being woven in a pronounced rib weave over at least a portion of the width of the fabric with the ribs running in the direction of the width of the fabric.

## 3,788,366
## NARROW ELASTIC FABRIC

Roger G. Campbell, Sr.; Richard E. Goff, Jr., both of Barrington, and Normand D. Guay, Woonsocket, all of R.I., assignors to Johnson & Johnson, New Brunswick, N.J.

Filed Oct. 4, 1971, Ser. No. 186,364
Int. Cl. D03d *15/08*; A41d *1/06*
U.S. Cl. 139—421 9 Claims

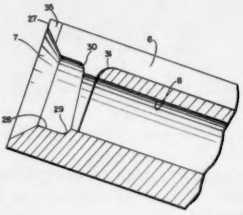


A narrow elastic fabric suitable for use in the band encircling portions of articles of apparel. The fabric has monofilament yarns in the transverse direction of the fabric and elastic yarns in the longitudinal direction of the fabric. The elastic yarns are woven under tension in a leno weave with longitudinally extending non-elastic yarns. The leno woven elastic yarns are on one surface of the fabric and the leno woven nonelastic yarns are on the opposite surface to provide the fabric with a transverse concave configuration.

## 3,788,367
## WIRE WRAP TOOL

Daniel W. Ackerman, Binghamton, N.Y., assignor to Universal Instruments Corporation, Binghamton, N.Y.

Continuation-in-part of Ser. No. 195,252, Nov. 3, 1971, Pat. No. 3,756,522. This application May 15, 1972, Ser. No. 253,460
Int. Cl. B21f *15/00*
U.S. Cl. 140—124 7 Claims

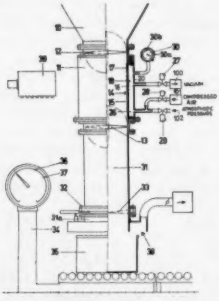


A wire wrap tool having an elongated cylindrical bit with an aperture in the end thereof for receiving a terminal stud and a wrapping sleeve which telescopes on the bit to lock a length of wire thereon, the telescoping of the bit and sleeve being accomplished on the tool by either a pneumatic, mechanical or similar type mechanism. The area of the bit between the end of the bit and the aperture has a concave conical section and a cylindrical section.

## 3,788,368
## APPARATUS FOR FILLING A RECEPTACLE WITH COMPACTED PULVERULENT MATERIAL

Peter Geng, Allschwil; Robert Gueniat, Reinach; Alfred Zollinger, Fullinsdorf; Walter Luscher, Seltisberg; Hansjorg Schawalder, Zurich, and Hanspeter Tschanen, Dallikon, all of Switzerland, assignors to Gericke & Co., Regensdorf, Switzerland

Filed Dec. 20, 1971, Ser. No. 209,825
Claims priority, application Switzerland, Dec. 21, 1970, 18905/70
Int. Cl. B65b *1/16*
U.S. Cl. 141—67 20 Claims

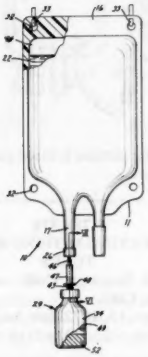


An apparatus for filing a receptacle with compacted pulverulent material comprising a compaction compartment equipped with a closable inlet and outlet. A negative pressure source, atmospheric pressure and/or an overpressure source can be connected via a filter mechanism with the compaction compartment. According to important aspects of the invention a supply compartment is connected following the compaction compartment, the outlet of the supply compartment being equipped with a dosing mechanism.

## 3,788,369
## APPARATUS FOR TRANSFERRING LIQUID BETWEEN A CONTAINER AND A FLEXIBLE BAG

**Fred M. Killinger, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.**

**Filed June 2, 1971, Ser. No. 149,321**
**Int. Cl. B65b** *3/16*
**U.S. Cl. 141—114** **4 Claims**

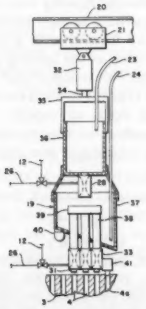


A resiliently flexible bag has a chamber with inlet and outlet passageways, the outlet passageway being connectible to a tube and the inlet passageway having perforable closure means. The chamber is normally filled with a liquid, such as a saline solution. A cannula is mounted upon a container for insertion through the closure member and communication between the chamber in the bag and the interior of the container. If the container holds a liquid, intermittent, manual compressing and releasing of the flexible bag causes the liquid within the bag to move into the container or the liquid in the container to move into the bag, depending upon their relative vertical positions. A special cannula and container therefor are provided to furnish filtered air to the bag prior to connection thereof with the container if such air is needed.

## 3,788,370
## PARTICULATE SOLIDS TUBE LOADING APPARATUS

**Thomas R. Hare, Oakland, and Clifford C. Segerstrom, Lafayette, both of Calif., assignors to Shell Oil Company, Houston, Tex.**

**Filed Feb. 10, 1972, Ser. No. 225,257**
**Int. Cl. B65b** *1/06*
**U.S. Cl. 141—125** **12 Claims**

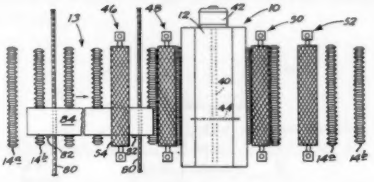


Vertical tubes are expeditiously filled to a predetermined depth with flowable, particulate solids by an apparatus which comprises (a) a temporary storage reservoir for the flowable, particulate solids; (b) conveying means for supplying the temporary storage reservoir with flowable, particulate solids; (c) an overflow reservoir supported by and vertically below the temporary storage reservoir; (d) a temporary storage reservoir flow control means for regulating the quantity of flowable, particulate solids passing out of the temporary storage reservoir and into the overflow reservoir; (e) at least one vertically oriented measuring tube secured to and passing through the bottom of the overflow reservoir, which measuring tubes are (i) located beneath the temporary storage reservoir flow control means; (ii) open at their upper ends for the receipt of flowable, particulate solids which pass through the temporary storage reservoir flow control means; and (iii) restricted at their lower ends by a measuring tube flow control means, to which an outlet nozzle of variable, restricted flow area is attached; (f) screeding means for leveling the flowable, particulate solids within the measuring tube; (g) positioning means for locating the outlet nozzles above the vertical tubes to be filled with flowable, particulate solids; and (h) conveying means for removing excess flowable, particulate solids collected in the overflow reservoir.

## 3,788,371
## SAW APPARATUS WITH DISK BED SUPPORT FOR LUMBER

**Howard C. Mason, Oregon City, Oreg., assignor to H. C. Mason & Associates, Inc., Gladstone, Oreg.**

**Filed June 26, 1972, Ser. No. 266,214**
**Int. Cl. B27b** *1/00*
**U.S. Cl. 144—312** **9 Claims**



Saw apparatus for cutting lumber along its length. The apparatus has a disk bed for supporting the lumber as the same moves during cutting, including multiple disks disposed in rows and spaced laterally from each other along the direction of travel of the lumber. The lumber is forced downwardly against the disks by pressure-applying instrumentalities, at a sufficient pressure to cause the disk edges slightly to penetrate the wood on the underside of the lumber without substantially exceeding the elastic limit of the wood. Cutting is performed while the forward travel of the lumber is so controlled. The pressure-applying instrumentalities are so adjusted as to permit the lead end of a lumber piece to pass therebeyond before coming down to produce the pressure. A method of cutting lumber along its length where the lumber is moved over a multiple-disk bed and the lumber is pressed downwardly against the disks in such bed with upper edges penetrating the wood in the lumber during the process of the cutting.

## 3,788,372
## METHOD FOR MAKING A FABRICATED WOODEN PRODUCT

**Amerigo Terenzoni, 821 Third St., Fresno, Calif.**

**Filed Jan. 21, 1972, Ser. No. 219,773**
**Int. Cl. B27d** *1/08*
**U.S. Cl. 144—316** **6 Claims**

A wooden product and a method of fabricating the product characterized by the steps of forming a plurality of construc-

tion members of an annular configuration, each including a plurality of wooden blocks mated in an abutting, end-to-end relation, and adhesively uniting the construction members in a

coaxial and contiguous relationship, for thus forming a tubular body and thereafter finishing the external surfaces of the body to a predetermined configuration by removing therefrom excess material.

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**3,788,373**

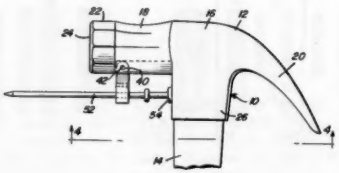
**HAMMER WITH NAIL HOLDER**

**Daniel A. Aherin, 209-B Fowler St., China Lake, Calif.**

**Filed Apr. 7, 1972, Ser. No. 242,007**

**Int. Cl. B25d** *1/04*

**U.S. Cl. 145—30 R** **5 Claims**



A pivotally retractible nail supporting clip mounted upon the neck of a conventional hammer whose free end defines a head. The clip is supported for swinging movement between a retracted position within a longitudinal groove cut in the neck of the hammer head and an extended position disposed at right angles relative to the hammer head neck and projecting toward the free end of the associated hammer handle. The clip clampingly engages an associated nail in position paralleling the neck and with the pointed end of the nail projecting outwardly beyond the head of the hammer while the head end of the nail is abutted against the sleeve portion of the hammer head in which the associated handle is secured.

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**3,788,374**

**PARENTERAL SOLUTION BAG**

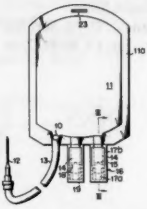
**Mitsuaki Saijo, Fujinomiya, Japan, assignor to Jintan Terumo Co., Ltd., Tokyo, Japan**

**Continuation-in-part of Ser. No. 71,309, Sept. 11, 1970, abandoned. This application Jan. 26, 1972, Ser. No. 220,763**

**Int. Cl. B65d**

**U.S. Cl. 150—1** **3 Claims**

A parenteral solution bag is provided with openings protruding from the perimeter of said bag for taking in or out parenteral solution and with a protective closure for hermetically enclosing this protruded portion. To the protective closure of the protruding portion is fused part of a tab for tearing said protective closure.



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**3,788,375**

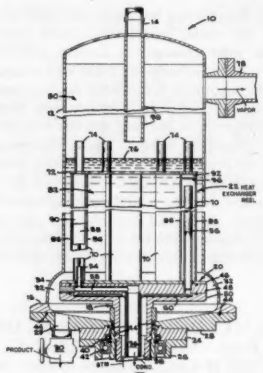
**EVAPORATOR HAVING MOVING HEAT EXCHANGE TUBES**

**Samuel A. Mencacci, Saratoga, Calif., assignor to FMC Corporation, San Jose, Calif.**

**Filed Nov. 15, 1972, Ser. No. 306,946**

**Int. Cl. B01d** *1/00, 1/30;* **B01p** *7/16;* **B01f** *15/00;* **F28f**

**U.S. Cl. 159—25 A** **16 Claims**



An evaporator including a processing tank filled with a product to be evaporated. A reel is mounted for rotation within the tank and is formed, in part, of a plurality of spaced heated tubes which provide moving heat exchange surfaces and which, in motion, cavitate at their trailing edges. The heat exchange tubes are each formed with a cross-sectional configuration defining a pocket at the trailing edge thereof which maximizes the area of the cavitational void. Conduits are fixed at the ends of the tubes relative to each cavitation void to continuously evacuate the voids of vapors resulting from the evaporation of the product in the processing tank and to deliver the vapors to a location at one end of the tank where they can be withdrawn.

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**3,788,376**

**DRAPERY**

**Leo Mednick, deceased, late of Philadelphia, Pa. (by Shirley S. Shipon, executrix), 1040 Novelt Dr., Philadelphia, Pa.**

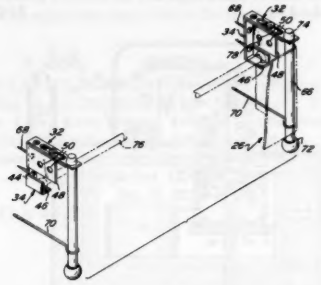
**Filed July 28, 1972, Ser. No. 276,182**

**Int. Cl. E06b** *9/00;* **A47n** *5/32*

**U.S. Cl. 160—19** **14 Claims**

A drapery comprising a pair of panels horizontally slidable on a supporting rod. Each of the panels has a string secured

thereto at one edge. The edges of the panels having the secured strings thereon are positioned adjacent each other, and are slidable away from each other. Each string has two ends, with the ends extending across the width of both panels and being slidably supported exteriorly of the panels. The pulling of each string in one direction will pull a panel away



from the other. The pulling of the string in the other direction will pull the panel toward the other. In this way one or both panels of the drapery can be opened. The drapery further includes an associated valance which comprises a pair of rods which are vertically extending. The valance comprises a stretchable fabric which is stretched around the rods.

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**3,788,377**

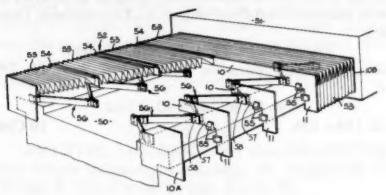
**CORRUGATED COVERS FOR RECIPROCATING MACHINERY PARTS**

**Peter M. Knowles, Datum, England, assignor to Henry Beakbane (Fortox) Limited, Kidderminster, England**

**Continuation-in-part of Ser. No. 7,519, Feb. 2, 1970, abandoned. This application Feb. 1, 1972, Ser. No. 222,591**

**Int. Cl. A47h** *5/00*

**U.S. Cl. 160—84 R** **4 Claims**



For use in a corrugated cover, a section which includes a corrugated body portion and extension control means contained in the corrugated body portion, the extension control means comprising a plurality of hingedly connected flat metal strips.

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**3,788,378**

**FLOOR AREA DIVIDER**

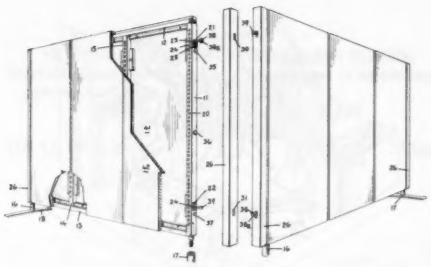
**Sydney Murray Sobel, Toronto, Ontario, Canada, assignor to OSF Industries Limited, Toronto, Ontario, Canada**

**Filed July 16, 1971, Ser. No. 163,368**

**Int. Cl. A47g** *5/00*

**U.S. Cl. 160—135** **4 Claims**

A floor area divider for use in planning and dividing the floor area of a room into a number of separate work spaces, each space being organized as to size and shape for the particular use to which the area is to be put. The divider may consist of a single free stand panel or a plurality of panels hingedly connected together to provide an enclosure which defines a particular space in relation to adjoining spaces. Each panel includes a rectilinear metal frame of rigid tubular material generally square in cross section with the frame subdivided into one or more panel sections. Each panel section is enclosed within a panel sleeve made in half-sections so that a pair of mating halves can be mounted on or removed from its



respective frame without the use of tools. Hinges allow two or more panels to be joined together and placed at any angle to one another. The panel sleeves are arranged in edge-to-edge relationship to completely conceal the frame. The partition is easily moved from place to place by manpower without the use of any tools. The components can be assembled to form the partition without the use of tools and can, likewise, be dismantled.

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**3,788,379**

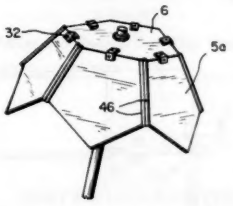
**READILY RELEASABLE INTERCONNECTING MEANS FOR PANELS**

**Macon D. Rice, P.O. Box 1905, Hawthorne, Nev., and Emil G. Anderson, 707 Van Buren St. N.W., Washington, D.C.**

**Continuation-in-part of Ser. No. 854,442, Sept. 2, 1969, Pat. No. 3,614,835. This application Oct. 4, 1971, Ser. No. 186,056**

**Int. Cl. E06b** *3/12*

**U.S. Cl. 160—235** **7 Claims**



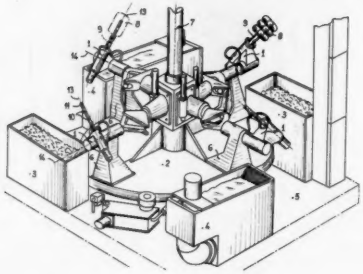
The interconnecting means between contiguous panels or sheets or between a panel and a support therefor is designed to facilitate the assembly of panels or sheets to form the desired structure. The means has a more or less rigid member with one or more slotted channels thereon which are adapted to receive resilient, or springy, slotted sleeves expandable into a tight fit in the channel when the panels are inserted in the slot in the sleeve.

3,788,380

## METHODS OF MANUFACTURING SHELL MOULDS

Philippe Jasson, and Pierre Chatourel, both of Billancourt, France, assignors to Regie Nationale Des Usines Renault, Billancourt, France

Filed June 15, 1971, Ser. No. 153,332
Claims priority, application France, July 3, 1970, 70.24842
Int. Cl. B22c *13/08*
U.S. Cl. 164—26 2 Claims



Method of manufacturing shell moulds wherein each disposable mould comprises a central core frame secured to an operating head utilized for immersing the pattern in succession into vessels containing alternately refractory slip and refractory grains in the form of fluidized suspension, respectively, said central core frame revolving automatically about the vertical axis of a turnstile adapted, through an intermittent rotation, to bring in succession said head above the vessels, about another axis of said core frame and finally about an axis perpendicular to said core frame axis for performing a limited pivotal movement sufficient however for immersing the pattern into each vessel and removing it therefrom during the pauses produced in the rotation of said turnstile, this method applying more particularly to precision foundry processes.

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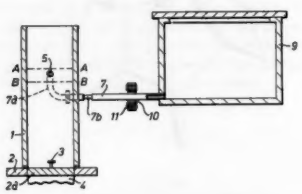
3,788,381

## METAL REFINING PROCESS

Geoffrey Hoyle, and David Melvin Longbottom, both of Sheffield, England, assignors to The British Iron and Steel Research Associates, London, England

Filed May 22, 1972, Ser. No. 255,571
Claims priority, application Great Britain, June 8, 1971, 19449/71
Int. Cl. B22d *27/02*
U.S. Cl. 164—52 12 Claims



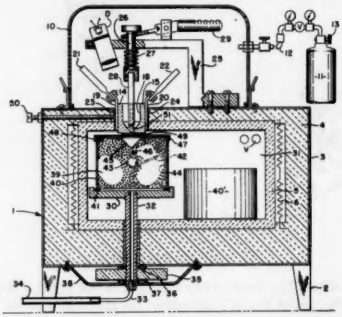
A process for refining metals in which metal introduced to a vessel is refined as it passes in droplet form through a bath of molten slag, comprising introducing the metal in molten state and at a controlled rate to the vessel through one or more apertures which are formed in that part of the vessel wall which confines the slag bath.

3,788,382

## VACUUM METAL CASTING APPARATUS

Arnold Daniel, 2219 Devonshire Dr., and Joseph Burdette Richey, II, 2160 Demington Dr., both of Cleveland Heights, Ohio

Division of Ser. No. 92,583, Nov. 25, 1970, Pat. No. 3,712,364.
This application Oct. 26, 1972, Ser. No. 301,158
Int. Cl. B22d *27/16*
U.S. Cl. 164—150 22 Claims



A metal casting apparatus especially adapted for the rapid melting and casting of small charges of metal, utilizing a metal-heating crucible in communication with a mold contained in a heated enclosure. The metal charge within the crucible is rapidly heated to melt the same to bring the molten metal to optimum casting temperature, whereupon the molten metal in the crucible is subjected to sufficient pressure differential to force the molten metal through a small opening in the crucible into the mold.

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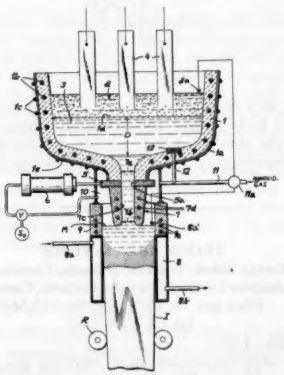
3,788,383

## APPARATUS FOR THE CONTINUOUS EXTRACTION OF ELECTROSLAG REMELTED METALS

Paul Metz, Emile Metz, Luxembourg, assignor to Acieries Reunies de Burbach-Eich-Dudelange S.A., Luxembourg, Luxembourg

Filed Apr. 14, 1971, Ser. No. 133,993
Claims priority, application Luxembourg, Apr. 16, 1970, 60743
Int. Cl. B22d *17/32, 27/02*
U.S. Cl. 164—156 10 Claims



An electroslag melting (e.g. remelting) of metal, under a slag or fused-flux layer, is carried out in a crucible provided

with a discharge neck which is received with clearance in a removable, replaceable and interchangeable continuous-ingot mold. The liquid/solid metal interface is maintained within the mold which has a liquid-free surface exposed to reducing or nonoxidizing gas pressure maintained to balance the hydrostatic pressure of the metal bath and flux layer in the melting chamber. As a consequence, the rate of flow of the metal from the melting crucible to the ingot mold is automatically controlled to equal the rate at which the ingot is withdrawn.

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**3,788,384**

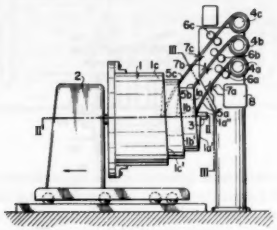
**APPARATUS FOR CONSTRUCTING SUBSTANTIALLY CIRCULAR CROSS-SECTION VESSEL BY WELDING**

**Akira Ujiie, Kobe, Japan, assignor to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan**

**Division of Ser. No. 5,311, Jan. 23, 1970, Pat. No. 3,665,143. This application Oct. 18, 1971, Ser. No. 190,423**

**Int. Cl. B22d** *27/02*

**U.S. Cl. 164—252** **4 Claims**



A multi-layer, thick wall, substantially circular cross-section metal vessel includes a plurality of concentric tubular layers formed by the progressive deposition of molten weld metal mainly provided by electroslag welding process to form continuous helical strips with the axially adjacent convolutions of each helical strip being contiguous. The several helical strips are formed simultaneously, and each helical strip is solidified in contact with solidified metal. Each strip of molten metal forming a tubular layer of a relatively larger diameter is deposited progressively and progressively solidified onto a tubular layer of smaller diameter with an axial offset corresponding to a predetermined pitch of a helix.

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**3,788,385**

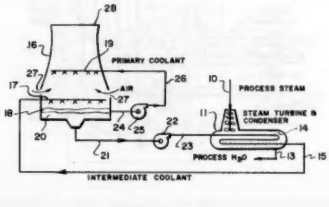
**DRY TYPE, LIQUID-SOLID COOLING SYSTEM**

**Terry Wayne Delahunty, La Grange, Ill., assignor to Chicago Bridge & Iron Company, Oak Brook, Ill.**

**Filed Nov. 23, 1970, Ser. No. 91,931**

**Int. Cl. F25b** *13/00*

**U.S. Cl. 165—2** **29 Claims**




To cool a hot first material it is brought into heat exchange with a particulate solid second material which liquefies through such heat exchange, the liquefied second material is removed from heat exchange with the first material, cooled and converted into solid particulates, and the solid particulates of the second material are brought into heat exchange recontact with the hot first material. The system is useful in the cooling of hot water from an electric power generating plant.

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**3,788,386**

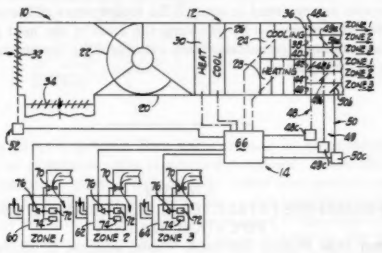
**MULTIPLE ZONE AIR CONDITIONING SYSTEM**

**Merlin E. Demaray, Columbus, Ohio, assignor to Ranco Incorporated, Columbus, Ohio**

**Filed Nov. 30, 1971, Ser. No. 203,329**

**Int. Cl. F24f** *3/08*

**U.S. Cl. 165—2** **7 Claims**




A multiple zone air conditioning system is disclosed having a control system in which heating or cooling equipment is controlled according to the maximum and minimum zone air conditioning loads. The control system is constructed using electronic components which are protected against damage due to improper installation.

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**3,788,387**

**Patent Not Issued For This Number**

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**3,788,388**

**HEAT EXCHANGE SYSTEM**

**Herman G. Barkmann, Santa Fe, N. Mex., assignor to Q-dot Corporation, Santa Fe, N. Mex.**

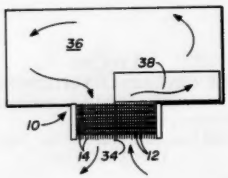
**Continuation-in-part of Ser. No. 824,584, May 14, 1969, abandoned. This application Feb. 19, 1971, Ser. No. 116,758**

**Int. Cl. F28d** *15/00*

**U.S. Cl. 165—32** **21 Claims**

A heat exchange system for transferring heat between intake air flowing into an enclosure and exhaust air flowing out of the enclosure. The system includes a plurality of fins and a plurality of heat pipes each extending into engagement with all of the fins. Half of the fins are positioned for engagement by

the intake air and half are positioned for engagement by the exhaust air. The heat pipes are bi-directional and self regulating so that both the direction and the rate of heat transfer in the system depend upon the relative temperatures of the intake air and the exhaust air. The efficiency of the heat pipes can also be regulated to control the temperature of the air entering the enclosure by elevating the ends of the heat pipes, either manually or automatically to control the temperature of the incoming air.

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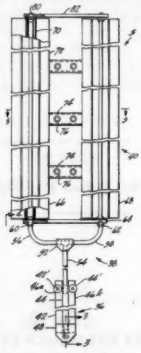
**3,788,389**
**PERMAFROST STRUCTURAL SUPPORT WITH HEAT PIPE STABILIZATION**

**Elmer Dale Waters, Richland, Wash., assignor to McDonnell Douglas Corporation, Santa Monica, Calif. Canada**

**Filed Aug. 25, 1971, Ser. No. 174,687**
**Int. Cl. F28d** *15/00*
**U.S. Cl. 165—45** **9 Claims**



Structural support assembly for use in artic and subartic (permafrost) areas or in any areas where the upper ground layer is subject to a severe annual freeze-thaw cycle, including the cooperative combination of a support structure and a heat pipe element installed in generally frozen soil. The heat pipe is of a suitably complementary configuration and/or disposition with respect to the support structure to provide appropriate stabilization of the surrounding frozen soil. In one embodiment, the heat pipe element is disposed externally of the support structure and, in another embodiment, it is disposed internally of (and integrally combined with) such structure. The external embodiment further includes one version employing a linear (straight) heat pipe element and another version employing an angular (helical) element.

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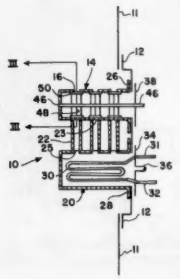
**3,788,390**
**EMERGENCY MASTER CONTROL VALVE**

**William G. Lewers, Chincoteague, Va., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.**

**Filed Dec. 8, 1972, Ser. No. 313,390**
**Int. Cl. F28d** *1/06*
**U.S. Cl. 165—74** **10 Claims**




An improved tank heater for lowering the viscosity of liquids stored in tanks and for isolating the liquid such that the tank heater coils can be removed and repaired without having to drain the tank.

This improved tank heater has advantages over prior tank heaters in that it is mechanically simpler to build and operate and allows heating coil repairs to be performed without having to drain the tank in which the steam coil is located.

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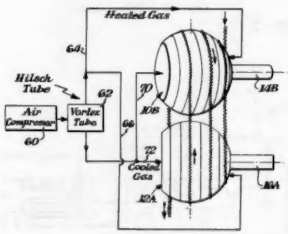
**3,788,391**
**ROLL ASSEMBLY**

**J. Packard Laird, 915 Center Rd., Wilmington, Del.**

**Filed Aug. 18, 1971, Ser. No. 172,635**
**Int. Cl. F28d** *11/02*
**U.S. Cl. 165—65** **20 Claims**




A roll assembly for receiving elongated material passing thereover comprises a pair of spaced rolls mounted on shafts which are skewed at an angle with respect to each other. The rolls are arranged to accept the material for travel over its ideal path wherein the points at which the material enters and

leaves each roll are coarcuate with the path being disposed on each roll along lines of contact with that roll and with the lines of contact of each roll being disposed upon the surface of an imaginary sphere and each such line of contact being coplanar with the path of the material as it approaches and leaves said line of contact.

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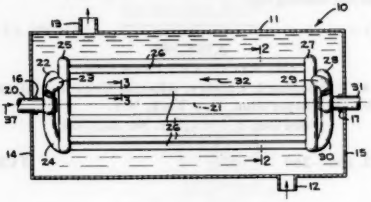
### 3,788,392
### REVOLVING LINEAR TUBE HEAT EXCHANGER

**John A. Abbott, Menlo Park, and Samuel A. Mencacci, Saratoga, both of Calif., assignors to FMC Corporation, San Jose, Calif.**

**Filed July 6, 1971, Ser. No. 159,912**
**Int. Cl. F28d *11/04***
**U.S. Cl. 165—92** **7 Claims**



A linear tube through which heating fluid flows is mounted to revolve within an elongated tank containing a liquid to be heated. The tube extends longitudinally within the tank and moves transversely in an orbital path with the trailing portion of the tube formed to reduce the tendency for a film of liquid being heated to burn thereon. The tube can be formed in such a manner by either streamlining the transverse surface configuration thereof so that the tube will move through the liquid within the tank with a more nearly unbroken flow thereabout or by insulating the trailing portion of the tube to reduce heat transfer by conduction from the heating fluid within the tube. The tube is supported in a manner so as to remove heating fluid condensate and cause liquid being heated to flow longitudinally within the tank. An arrangement of a multiplicity of tubes for movement through the liquid being heated without elimination of flow thereabout is also provided.

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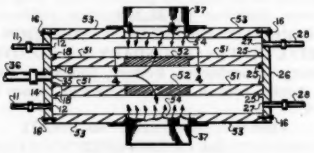
### 3,788,393
### HEAT EXCHANGE SYSTEM

**Bruno T. Plizak, Philadelphia, Pa., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed May 1, 1972, Ser. No. 248,885**
**Int. Cl. F28f *3/04*, *13/02***
**U.S. Cl. 165—109** **1 Claim**



Heat transfer is accomplished by having two adjacent chambers with an outside partition of a first chamber made of heat conductive material for conducting heat inwardly into the first chamber which has a coolant liquid flowing through it. A second chamber has a gas at a pressure higher than the water in the first chamber. A partition between both chambers is made of a gas porous material so that the gas in the second chamber penetrates the connecting wall and flows through the coolant liquid breaking up the formation of liquid coolant film on the heat conductive material.

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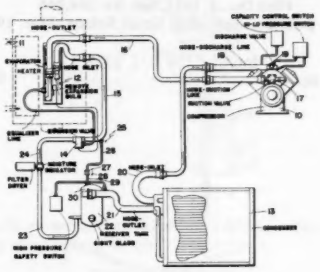
### 3,788,394
### REVERSE BALANCE FLOW VALVE ASSEMBLY FOR REFRIGERANT SYSTEMS

**Don C. Derragon, Jr., Pembina, N. Dak., assignor to Motor Coach Industries, Inc., Pembina, N. Dak.**

**Filed June 1, 1972, Ser. No. 258,870**
**Int. Cl. F25b *41/00***
**U.S. Cl. 165—134** **3 Claims**



The reverse balance flow valve is used in circumstances using an expansion valve controlled evaporator where the air conditioner evaporator coils and the heater core are in a common plenum chamber. It is a one-way valve installed between the line extending from the expansion valve to the evaporator and the upper gas portion of the receiver tank on the high pressure liquid side of the condenser. It automatically relieves or balances the pressure in the system during non-air conditioning cycles (where the compressor is connected to the engine at all times), when and if the refrigerant on the evaporator side increases in pressure over the refrigerant on the condenser side thus preventing refrigerant and oil migration and subsequent flooded starts with possible damage to the compressor when the refrigerant unit is switched to the air conditioning cycle.

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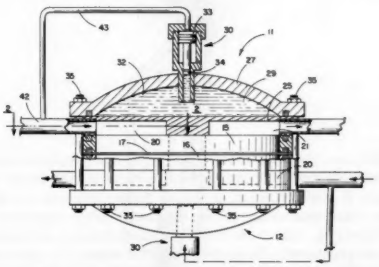
### 3,788,395
### FLUID PRESSURIZED COVER DEVICE

**Stellan Knoos, Malibu, Calif.; Soren F. S. Ljungdahl, Taby, and Bertil Ingemar Bostrom, Danderyd, both of Sweden, assignors to AGA Aktiebolag, Taby, Sweden, a part interest**

**Continuation-in-part of Ser. No. 259,009, June 2, 1972. This application Feb. 5, 1973, Ser. No. 329,539**
**Int. Cl. F28f *3/12***
**U.S. Cl. 165—169** **6 Claims**



A cover assembly is used for retaining members such as the heat exchanger elements of a heat exchanger in clamping engagement with a diaphragm which is interposed therebetween.

The cover assembly has an inner plate and an outer plate which form a chamber within which a fluid medium is contained. The fluid is pressurized to provide force distributed uniformly over the surface of the inner plate, thereby enabling this plate to resist forces which would otherwise tend to cause it to buckle, and assuring clamping pressure to clamp the members together over their entire contact area to enable good thermal transfer therebetween.

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**3,788,396**

**WELL RE-ENTRY TOOL WITH BUMPERHEAD**

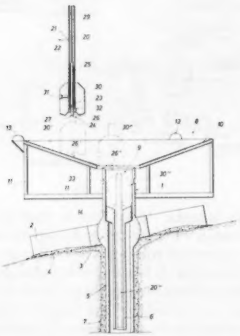
**Howard L. Shatto, Jr., and Johannes A. W. J. Van Dommelen, both of The Hague, Netherlands, assignors to Shell Oil Company, New York, N.Y.**

**Filed Dec. 2, 1971, Ser. No. 204,046**

**Claims priority, application Great Britain, Mar. 10, 1971, 6,446/71**

**Int. Cl. E21b** *7/12, 33/035*

**U.S. Cl. 166—.5** **9 Claims**



To prevent damage to an orienting device used for re-entry into wells located on the floor of a body of water on which a guide cone is mounted a bumperhead is mounted on the lower end of the tubing string carrying the orienting device.

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**3,788,397**

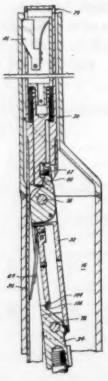
**KICKOVER TOOL**

**Ben D. Terral, and Harold E. McGowen, Jr., both of Houston, Tex., assignors to Camco, Incorporated, Houston, Tex.**

**Filed Oct. 24, 1972, Ser. No. 299,812**

**Int. Cl. E21b** *23/02*

**U.S. Cl. 166—117.5** **7 Claims**



An improved kickover tool and well valve handling apparatus for placing a valve in or removing a valve from an offset side pocket in a well tubing and having a support body, a shifting tool pivotally supported from the support body with spring means yieldably urging the shifting tool into the side pocket by providing means for releasing the shifting force of the spring from the shifting tool after use whereby the shifting tool may become aligned in the well tubing for removal. The spring being a leaf spring with one end held under compression by shear means engageable by a valve handling support so as to be sheared when the valve handling support is pivoted relative to the shifting tool so that the shifting tool may become pivotally aligned in the tubing from the support body. Adjustable means for moving the valve handling support about a pivot from the shifting tool for engagement with the shearing means. A rotatable joint connected between the support body and the shifting tool secured by a shear pin to the shifting tool and sheared by movement of the shifting tool relative to the body for allowing greater lateral shifting movement of the shifting tool.

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**3,788,398**

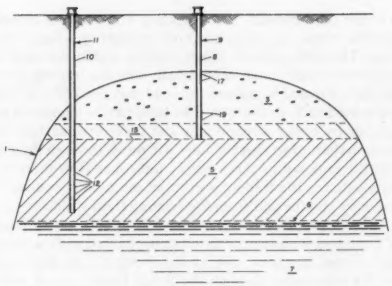
**OIL RECOVERY PROCESS**

**Cecil A. Y. Shephard, Calgary, Alberta, Canada, assignor to Mobil Oil Corporation, New York, N.Y.**

**Filed Dec. 1, 1971, Ser. No. 203,762**

**Int. Cl. E21b** *43/16*

**U.S. Cl. 166—269** **5 Claims**



This specification discloses a process of recovering oil from an oil-containing reservoir having a gas cap. In accordance with this process there is injected into the gas cap a fluid that is miscible with the oil in the reservoir and gas in the gas cap. Also injected into the reservoir are gas and water in an amount no greater than that amount which can be maintained within the gas cap without flowing into the oil zone. Oil is produced from the reservoir from locations that are structurally lower than the gas cap.

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**3,788,399**

**METHOD FOR INHIBITING ADSORPTION OF SURFACTANT IN SECONDARY OIL RECOVERY**

**David George Feuerbacher, Bellaire, and Mary Kay Hrncir Smith, Austin, both of Tex., assignors to Texaco Inc., New York, N.Y.**

**Filed Dec. 30, 1971, Ser. No. 214,471**

**Int. Cl. E21b** *43/22*

**U.S. Cl. 166—274** **14 Claims**

A process for recovering petroleum from a subterranean reservoir by flooding with a surfactant wherein the adsorption of surfactant by the reservoir rock is inhibited by treating the reservoir with an aqueous preflush solution of a water soluble salt of a strong mineral acid having an oxygen containing anion prior to injecting the surfactant. Preferably, treatment is accomplished by injecting an aqueous solution of soluble

nitrates, sulfates or phosphates into the reservoir in an amount sufficient to satisfy substantially all of the adsorption capacity of the reservoir matrix followed by injection of an aqueous solution of the surfactant. The preflush compound and the surfactant solution can be subsequently displaced through the formation by any convenient aqueous drive fluid including water.

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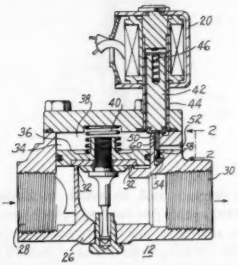
**3,788,400**

## FIRE EXTINGUISHING SYSTEM AND VALVE FOR USE THEREWITH

**Howard L. Tufts, Hingham, Mass., assignor to Pyrotector, Incorporated, Hingham, Mass.**

**Filed May 7, 1973, Ser. No. 357,924**
**Int. Cl. A62c** *37/08*
**U.S. Cl. 169—11** **6 Claims**




A fire extinguishing system and a valve for use therein, said system having both automatic and manual means for actuating the valve, said valve being designed for use in systems utilizing vaporizable extinguishants maintained under high pressure, and to give a very fast rate of extinguishant release, to allow the system to be used in applications where explosion suppression is desired. The valve is of the type utilizing a main valve and a pilot valve, in which the pilot valve is arranged to actuate the main valve by releasing the pressure on the back side thereof. In one embodiment of the invention pressure is supplied to the back side of the main valve piston only by leakage past the periphery of the piston. The pressure on the back side of the piston is released by the pilot valve to atmosphere rather than into the discharge line to avoid possible interference with said pressure release due to pressure buildup in the main discharge line. The pilot valve may be actuated by either a solenoid or mechanically by means contacting the face of the pilot valve covering the pilot valve discharge line, thereby avoiding sealing problems ordinarily encountered with such mechanical actuating means.

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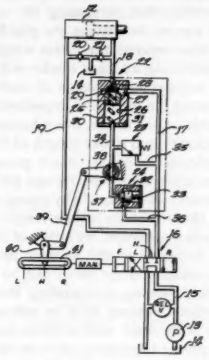
**3,788,401**

## HYDRAULIC CIRCUIT WITH VALVE TO PROVIDE SEMI-FLOAT CONTROL OF A DOZER BLADE

**James E. Scheidt, and Robert W. White, both of Joliet, Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.**

**Filed July 17, 1972, Ser. No. 272,482**
**Int. Cl. E02f** *3/76, 3/85;* **F15b** *13/04*
**U.S. Cl. 172—801** **8 Claims**

There is disclosed a control circuit having a semi-float position for a bulldozer blade. The circuit includes selectively controllable check and relief valves operative to prevent the blade from dropping under the influence of gravity, but permits the blade to be moved under the influence of forces developed by a vehicle being pushed thereby.

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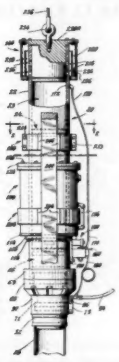
**3,788,402**

## AUTOMATICALLY SELF-REGULATING VARIABLE-STROKE, VARIABLE-RATE AND QUIET-OPERATING PILE DRIVER APPARATUS

**Stephen V. Chelminski, West Redding, Conn., assignor to Bolt Associates, Inc., Norwalk, Conn.**

**Division of Ser. No. 102,325, Dec. 29, 1970, Pat. No. 3,714,789. This application Aug. 14, 1972, Ser. No. 280,547**
**Int. Cl. E02d** *7/10*
**U.S. Cl. 173—91** **19 Claims**



Automatically self-regulating variable-stroke, variable-rate and quiet-operating pile driver apparatus are disclosed in which a massive piston weight is bounced upon a cushion of pressure fluid, the pile driver advantageously being adapted for operation in four different modes: (1) only double-acting, (2) single-acting automatically conyerting to double-acting at maximum stroke travel, (3) only single-acting, (4) pre-stressing plus impacting plus thrusting mode, and (5) pile extraction mode. The prolonged downward push resulting from the pressurized fluid-cushioned bouncing action is more

effective than the conventional sharp hammer-type blow resulting from impact of one solid mass against another. When the pile being driven encounters softer strata in the earth, in the single-acting mode, the stroke of the piston weight automatically shortens while the number of bounces per minute automatically increase thus increasing the rate of the quiet powerful bounce thrusts for driving the pile faster, and when harder strata are encountered, the piston weight automatically bounces higher providing a longer stroke with fewer bounces per minute, thus increasing the force of each quiet powerful thrust for overcoming the increased impedance being encountered. In the double-acting mode, when harder strata are encountered, the velocity and stroke length of the piston weight increase automatically to deliver more powerful thrusts. A relatively large number of driving thrusts per minute can be provided in the double-acting mode by changing the head plug mass to shorten the maximum stroke length to increase the frequency of thrusts per minute. By virtue of the pressure fluid bouncing action imparted to the massive piston weight, the noise of metal-to-metal contact blows can be avoided, and in addition a muffler housing surrounding the ports through which the expanded pressure fluid is released muffles the sound of the flow of the fluid, such as air or steam; this muffler also serving to separate lubricating oil from the released fluid. A cylinder bottom assembly below the bounce chamber is coupled to the pile being driven to transmit the quiet powerful bounce thrusts to the pile, moving in accordance with the pile motion, and a driving fluid storage chamber and valve mechanism associated with this assembly control the flow of the pressure fluid in an automatically self-regulating manner to seek the most effective driving action from moment-to-moment as the pile encounters different strata. If desired, the bouncing action of the cushion of pressure fluid can be altered to permit the piston weight to strike bottom slightly to provide the driving mode (4) above. A self-contained lubrication system may be actuated by the pressure impulses in the bounce chamber.

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**3,788,403**

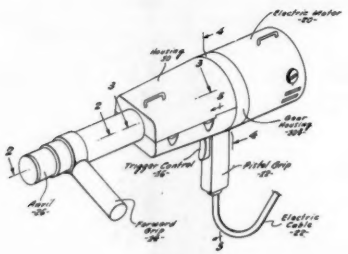
**POWERED IMPACT TOOL**

**William C. Mitchell, 23152 Bigler St., Woodland Hills, Calif.**

**Filed May 15, 1972, Ser. No. 253,434**

**Int. Cl. B25d** *11/04*

**U.S. Cl. 173—115** **7 Claims**




A powered impact tool, such as an automatic hammer, chisel, star drill, or the like, is provided which comprises a spring loaded anvil mounted at one end of a housing; a spring loaded plunger, or piston, mounted within the housing; a carriage which slides reciprocally within the housing; a drive for the carriage which imparts the desired reciprocal movement to the carriage; and a pawl which releasably couples the piston to the carriage to permit the carriage to draw the piston back against its spring, and which releases the piston at a selected point of each stroke of the carriage so that the piston spring drives the piston against the anvil which in turn drives the anvil through the end of the housing so that the anvil may provide a high impacting force on the nail or other object being impacted by the tool. An adjustable trigger is also provided by which the displacement of each stroke of the piston, and thus the impact with which it strikes the anvil, can be controlled.

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**3,788,404**

**PNEUMATIC IMPACT TOOL**

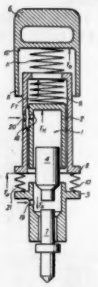
**Vladimir Koudelka, Roztoky u Krivoklatu, and Mirko Lada, Prague, both of Czechoslovakia, assignors to Naradi, Narodni podnik, Prague, Czechoslovakia**

**Filed Jan. 28, 1972, Ser. No. 221,584**

**Claims priority, application Czechoslovakia, Feb. 1, 1971, 71703**

**Int. Cl. B25d** *17/24*

**U.S. Cl. 173—139** **3 Claims**



A penumatic impact tool, in which oscillations below the frequency of 1000 cycles per second, which are detrimental to the health of the operator, are substantially reduced by the arrangement of the working cylinder as a dilation cylinder, composed of two axially aligned parts, cushioned with respect to the body of the tool.

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**3,788,405**

**PROCESS FOR PLUGGING FORMATIONS**

**James B. Taylor, Calgary, Alberta, Canada, assignor to Trans-Canada Resources, Ltd., Vancouver, British Columbia, Canada**

**Filed Aug. 23, 1971, Ser. No. 174,086**

**Int. Cl. E21b** *21/04*

**U.S. Cl. 175—72** **13 Claims**

A composition for use in plugging porous strata encountered during the drilling of a wellbore into an underground formation which composition comprises a mixture of straw and chemical wood pulp fibers in a weight ratio of 1:9 to 9:1 as well as a method of plugging said porous strata by adding said mixture to the drilling fluid recirculating through the well bore.

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**3,788,406**

**LOST CIRCULATION CONTROL**

**Joseph U. Messenger, Dallas, Tex., assignor to Mobil Oil Corporation, New York, N.Y.**

**Filed Dec. 27, 1971, Ser. No. 212,719**

**Int. Cl. E21b** *21/04*

**U.S. Cl. 175—72** **10 Claims**

This specification discloses a method of controlling the loss of drilling fluid into subterranean formations penetrated in the drilling of a well. An aqueous mixture comprising an emulsifying agent and preferentially oil-wettable granular particles in an amount greater than 100 pounds per barrel of mixture is introduced into the well. This aqueous mixture is circulated

down the well and into the formation into which the drilling fluid is being lost. The high concentration of granular particles serves to plug the formation and prevent loss of circulation thereinto.

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3,788,407

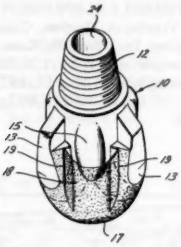
**METHOD AND ARRANGEMENT FOR PROTECTING AND GUIDING DRILLING BITS**

**Howard I. Lorenz, and Eugene P. Rosser, both of Houston, Tex., assignors to Noble Drilling Corporation, Tulsa, Okla., by said Rosser**

**Continuation of Ser. No. 107,786, Jan. 19, 1971, abandoned, which is a continuation-in-part of Ser. No. 832,673, June 12, 1969, abandoned. This application Oct. 17, 1972, Ser. No. 298,298**

**Int. Cl. E21b** *27/00*

**U.S. Cl. 175—307** **20 Claims**




A drilling bit for use in drilling wells such as oil and gas well boreholes in the earth is protected from damage prior to actual use at the bottom of the hole by enclosing the drilling bit with a molded jacket arrangement of impact resistant material. The jacket arrangement includes a fluid passageway system which cooperates with the fluid outlets of the bit, to accommodate fluid communication between the well bore and the interior of the drill string with which the bit is connected. The jacket means is preferably generally convex so that its forward central portion projects beyond the surrounding edge portion. The passage means terminates in outlets in the central portion which further protects the bit, and aids in keeping it from becoming "balled up." The fluid passageway system also enables fluid under pressure to be discharged through the bit and jacket arrangement without premature removal of the jacket arrangement so that the streams of fluid act on any backfill and debris present in the well bore to circulate such debris and backfill as the bit is lowered in the well bore to properly position it for further drilling operations before removal of the protective jacket arrangement.

The fluid passageway system may include a pressure responsive arrangement to enable at least partial removal of the protective jacket arrangement at any desired position of the bit in the borehole, or the jacket arrangement may be drilled off when the bit reaches bottom, if desired.

In one form of the invention, the protective arrangement is molded onto the bit. In another form of the invention, a premolded or pre-formed arrangement is provided which is expanded as it is forced over the bit and thereafter returns to its original configuration to retain the jacket arrangement on the bit. It may also be provided with portions which fit into the fluid outlets of the bit to further aid in supporting and retaining it in such position on the bit. In either case, the protective arrangement is constructed and arranged on the bit to also serve as a guide device for guiding the bit past various obstructions which may be present in a previously drilled portion of the earth borehole, or obstruction in the cased portion of the borehole. The invention also prevents balling of the drill bit and damage to the filter cake on the walls of the well bore.

3,788,408

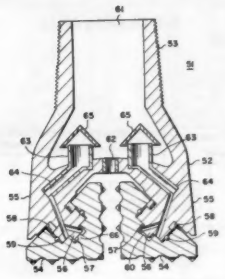
**ROCK BIT WATER DEFLECTOR AND SEPARATOR**

**Theodore R. Dysart, Dallas, Tex., assignor to Dresser Industries, Inc., Dallas, Tex.**

**Filed Apr. 20, 1970, Ser. No. 29,980**

**Int. Cl. E21b** *9/08*

**U.S. Cl. 175—337** **2 Claims**




A rotary bit with passageways for conducting air or other gaseous fluid to cool the bearings and flush cuttings from the borehole includes means for separating liquid from the air or gas. The stream of air is directed through a system of baffles to insure that only dry air reaches the bearings.

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3,788,409

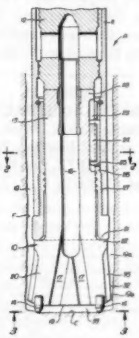
**PERCUSSION BITS**

**Alfred R. Curington, Houston, Tex., assignor to Baker Oil Tools, Inc., Los Angeles, Calif.**

**Filed May 8, 1972, Ser. No. 251,212**

**Int. Cl. E21c** *13/08, 13/01*

**U.S. Cl. 175—410** **12 Claims**



A percussion bit used in air hammer apparatus. The bit has a substantially flat, lower face in its main body portion from which compressed air discharges from bit passages to sweep formation cuttings or chips towards the sides of the bit body and upwardly around the exterior of the body. A multiplicity of tungsten carbide, or similar, buttons comprising rear or shank portions are embedded in the body, with tapered forward portions projecting substantially from the bit face for indenting and impacting upon the bottom of the bore hole being drilled in the formation, the forward portions of each button protruding from the bit face more than about 0.7 the diameter of its shank portion, whereby larger formation cuttings or chips are produced in the bottom of the bore hole, the bit drilling at a faster rate.

## 3,788,410
## FORCE MEASURING APPARATUS INCLUDING SENSITIVITY SELECTION MEANS

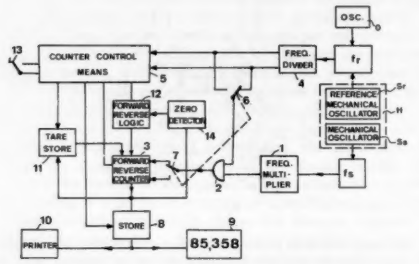
**Heinz Allenspach, Fallanden, and Eugen Meier, Meilen, both of Switzerland, assignors to Mettler Instruments AG, Zurich, Switzerland**

**Filed Aug. 2, 1972, Ser. No. 277,162**

**Claims priority, application Switzerland, Aug. 19, 1971, 012209/71**

**Int. Cl. G01g** *23/22*

**U.S. Cl. 177—25** **5 Claims**




Force measuring apparatus of the type including a mechanical oscillator, such as a string, that vibrates under load to produce a signal voltage the frequency of which is a function of the force to be measured. The invention is characterized in that following multiplication of the signal frequency, the signal is fed to multi-stage counter means for selected long or short periods of time corresponding with the desired sensitivity of measurement. The duration of the period of connection is controlled by a gate timing switch which is operable simultaneously with a stage selection switch associated with the counter, whereby when the connection periods are alternately long and short, the signal to be counted is fed to lower and upper counter stages, respectively. The gate tuning switch is operable alternately by a reference signal supplied from a mechanical oscillator, such as a crystal, or a reference string contained in the same housing as the measuring string.

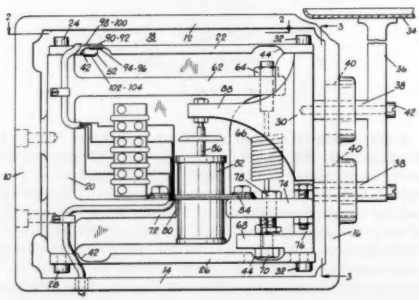
## 3,788,411
## STRAINWEIGH BALANCE

**Arthur R. Oxley, Battle Creek, Mich., assignor to Franklin Electric Subsidiaries, Inc., Bluffton, Ind.**

**Filed Nov. 1, 1972, Ser. No. 302,760**

**Int. Cl. G01g** *1/12, 23/26*

**U.S. Cl. 177—211** **16 Claims**



A weighing beam from which signals proportional to, or comparative with, applied weights, by means of strain measuring gauges attached to the beam consists of a pair of plates each having one edge supported along a horizontal line in vertically spaced parallel relation to each other. The opposite unsupported edges of the plates are rigidly connected by a platform support member having a load receiving platform rigidly secured thereto. Each plate has a first inner line of two holes formed symmetrically therethrough in laterally spaced relation to its supported edge, and the thickness of the plates is reduced along a line through the holes to produce a central and two laterally spaced flexing areas. Each plate has a similar outer line of two holes formed therethrough parallel to the inner line and adjacent the outer edges of the plates and the thickness of the plates is reduced along the line of the outer holes to form similar central and laterally spaced flexing areas. Electrically responsive strain gauges are secured to the upper and lower sides of the central flexing area at the inner side of one of said plates, and are connectable to amplifying and measuring devices for recording or indicating the amount of strain in proportion to the applied load or weight on the beam.

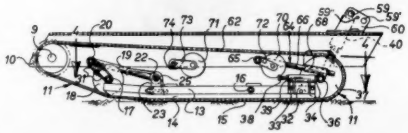
## 3,788,412
## SNOWMOBILE SUSPENSION SYSTEM

**Marcel Vincent, Vercheres, Quebec, Canada, assignor to The Coleman Company, Inc., Wichita, Kans.**

**Continuation-in-part of Ser. No. 179,780, Sept. 13, 1971, abandoned. This application May 17, 1972, Ser. No. 254,135**

**Int. Cl. B62d** *27/02*

**U.S. Cl. 180—5 R** **17 Claims**



A suspension system for tracked vehicles, more particularly snowmobiles, provides improved operation together with a smoother ride. The rear suspension of the frame and slide bar assembly is suspended from the snowmobile chassis by combined shock absorber and axially deformable tubular coil spring units pivotally attached to extend upwardly and rearwardly so that the coil spring and shock absorber units act downwardly and forwardly on the rear idle wheels and slide bars.

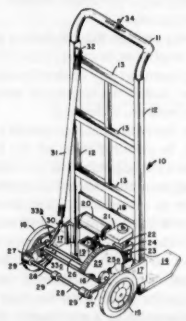
## 3,788,413
## STAIR TRAVERSING MECHANISM FOR HAND TRUCK

**Leo C. Miller, 11110 Dodson Ln., Wheaton, Md.**

**Filed Sept. 8, 1972, Ser. No. 287,436**

**Int. Cl. B62b** *5/02*

**U.S. Cl. 180—8 A** **22 Claims**



The present invention relates to a powered mechanism adapted to be attached to a standard hand truck to facilitate

the ascending or descending of a stairway with a load. An auxiliary shaft, to which are attached two lifter or climber arms whose extending ends carry associated stair contacting roller means, is mounted parallel to but displaced from the main wheel-carrying axle of the hand truck and is gear-driven to rotate the attached arms and roller means between two predetermined angular limits, with the output of a reversible electric motor. The energizing circuit for the motor is designed so that the motor can only be rotated in the opposite direction after one of the limits has been reached and so that positive and abrupt dynamic braking of the motor occurs when either limit is reached. An energy storage element in the form of a tension spring is connected to receive and store energy from the motor preparatory to ascending a stair and subsequently releases this stored energy to assist the motor during the actual lifting operation.

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**3,788,414**

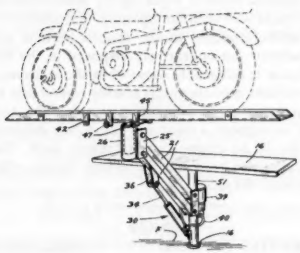
**SMALL VEHICLE LIFT**

**Felix P. Netter, 210-22nd Ave. N., Saint Cloud, Minn.**

**Filed Aug. 18, 1972, Ser. No. 281,659**

**Int. Cl. B60s** *13/00*

**U.S. Cl. 187—8.71** **9 Claims**



A small vehicle lift having a swiveling base embedded beneath the floor, a cantilever lifting arm including parallel links attached to the base, a hydraulic jack lifting the outer end of the arm, a vehicle support rack swiveling about a supporting bracket attached to the outer end of the cantilever arm and maintained level by the parallel links, the rack being tiltable relative to the support bracket for loading and unloading vehicles, and being shiftable to various positions over the bracket to more nearly center the weight of the vehicle over the bracket.

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**3,788,415**

**HYDRAULIC FRONT-WHEEL PROPULSION SYSTEM FOR HARVESTING VEHICLES**

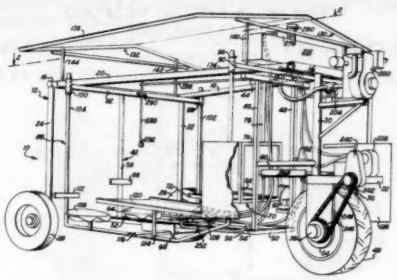
**Henry T. Tilley, P.O. Box 23, Bullock, N.C.**

**Continuation of Ser. No. 3,004, Jan. 15, 1970, abandoned. This application Feb. 22, 1972, Ser. No. 233,379**

**Int. Cl. B62d** *61/08*; **B60k** *17/30*

**U.S. Cl. 180—26 R** **7 Claims**

A hydraulic propulsion system utilized to propel and steer the front wheel of a harvesting vehicle under the control of a driver. The hydraulic system includes a manually operable forward-reverse-speed control mechanism, for selectively controlling a hydraulic motor which is operatively connected with the front wheel, as well as a foot-pedal operated steering



mechanism whereby the driver can effectively control the propulsion of the vehicle and, at the same time, assist with the harvesting operation.

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**3,788,416**

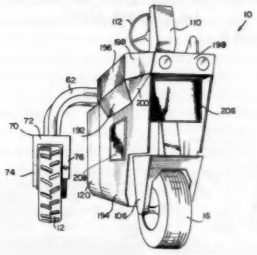
**HIGH-CLEARANCE AGRICULTURAL VEHICLE**

**Charles E. Sorenson, and Jon M. Grimmer, both of Evansville, Ind., assignors to Hahn, Inc., Evansville, Ind.**

**Filed May 26, 1972, Ser. No. 257,137**

**Int. Cl. B62d** *61/08*

**U.S. Cl. 180—27** **12 Claims**



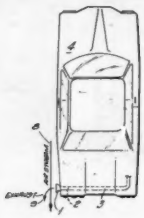
A high-clearance agricultural vehicle of the type used generally for spraying and otherwise treating row crops which grow to considerable height comprising a main frame extending longitudinally from the front to the rear of the upper portion of the vehicle, a pair of rear drive wheels disposed on opposite sides of and connected to the rear portion of the frame, a tank suspended from the frame to be disposed laterally between the rear wheels, a front wheel connected to the forward portion of the frame to be pivotally movable about a steering axis, an engine supported under the frame to be forwardly of the tank and behind the front wheel, and a transmission and axle assembly drivingly connecting the engine to the rear wheels. The main frame is defined by a pair of laterally spaced apart, longitudinally extending side members as the primary structural members. These members are formed to provide, above the engine, a cockpit for the operator of the vehicle, the rear portions of the members being laterally spaced apart by a distance approximately equal to the width of the tank. Each rear wheel is journal mounted by means of a yoke which is laterally adjustable relative to the frame. The engine is liquid cooled, and the radiator for the engine is disposed above the engine and in front of the cockpit in the frame. The fan associated with the radiator draws cooling air in from the side panels adjacent the engine and upwardly through the radiator and out through a grillwork in front of the radiator.

3,788,417

## EXHAUST DEVICE FOR AUTOMOTIVE VEHICLES

Floyd H. Willis, Los Angeles, Calif., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Apr. 26, 1972, Ser. No. 247,863
Int. Cl. B60k *13/04*
U.S. Cl. 180—64 A 1 Claim



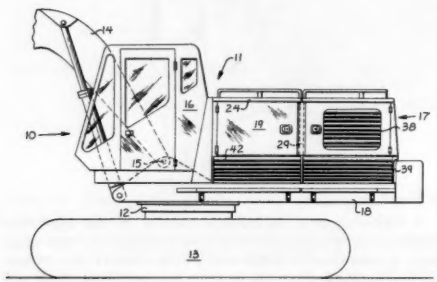
A funnel is affixed to and extends outward from the open free end of the tail pipe of the engine exhaust system of the engine of an automotive vehicle. A baffle is mounted in the throat of the funnel.

3,788,418

## SYSTEM FOR COOLING AN HYDRAULIC EXCAVATOR

Lawrence F. Clancy, Peoria; Emil B. Lee, Jr., Morton; William O. Smart, Dunlap, and John W. Yancey, Aurora, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Apr. 6, 1972, Ser. No. 241,757
Int. Cl. B60k *11/00*
U.S. Cl. 180—68 R 6 Claims



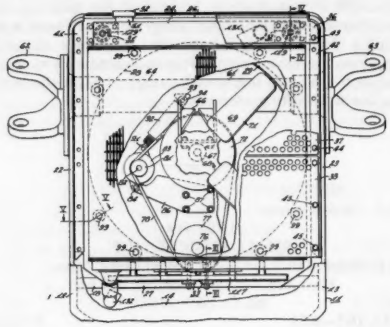
The body of an hydraulic excavator is divided into two separate compartments. The first and rearward compartment contains the prime mover engine with the hydraulic system pumps directly associated therewith. Air is drawn through one side inlet in the body across an hydraulic system heat exchanger and the engine coolant radiator by means of a fan mounted therebehind, and from thence across the engine and associated hydraulic pumping mechanisms. The air in this after compartment is thereafter exhausted through vents in the roof, the opposite side wall and the floor portions of the body. In a second compartment forward of the engine compartment is situated the hydraulic system fluid reservoir, valving and other hydraulic circuitry for the excavator vehicle. Openings in at least one side wall of the body, the roof and floor portions thereof permit air to circulate freely over these hydraulic components of the vehicle. A transverse fire wall separates the two compartments in the body and further serves to isolate engine and pump noise from the operator's station located in a cab portion at the front lefthand side of the body.

3,788,419

## VEHICLE FRAME INCLUDING RADIATOR AND FAN MOUNTING

Gary A. Drone, and James M. Schnepp, both of Springfield, Ill., assignors to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Nov. 16, 1972, Ser. No. 307,053
Int. Cl. B60k *11/04*
U.S. Cl. 180—68 R 10 Claims



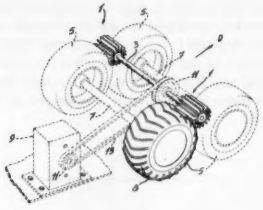
The vehicle frame has a radiator support including a pair of transversely spaced vertical walls rigidly interconnected by a transverse vertical wall with fan opening. A transverse beam is also rigidly interconnected to the spaced vertical walls and supports a radiator fan operatively disposed in the fan opening. The radiator is releasably secured to the transverse vertical wall on resilient mounts and is readily removable from the vehicle upon removal of protective panels. The transverse beam serves to support a tightener for a belt drivingly connecting the fan to an engine power takeoff shaft. The outer ends of the transverse beam carry brackets for the cylinders of a pair of bulldozer lift jacks.

3,788,420

## DIFFERENTIAL TYPE DRIVING WHEELS SYSTEM

Jean Paul Lacroix, 12064 Taylor Blvd., Montreal, Quebec, Canada

Filed Jan. 27, 1972, Ser. No. 221,348
Int. Cl. B60k *23/00*
U.S. Cl. 180—74 9 Claims



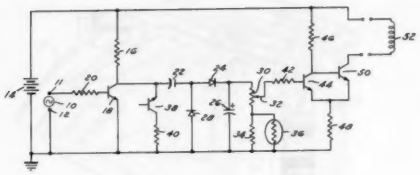
Two webbed driving wheels are rigidly secured at both ends of a rotating live axle, which axle, through a system of pullies and belt and a torque-converter, receives the rotating power generated by a motor. The webs of the driving wheels are made of resilient or flexible material and a certain number of these webs are in constant frictional engagement with two pairs of driven wheels. The power generated by the motor is transmitted to the driven wheels by the driving wheels and this, due to the frictional contact existing between them. When negociating curves the resilient webs of the driving wheels act as a differential system.

3,788,421

## ELECTRIC CIRCUITRY FOR VEHICLE SPEED RESPONSIVE SYSTEM

Michael Bozoian, Ann Arbor; Allen D. Krugler, Jr., Livonia, and Bernard G. Radin, Oak Park, all of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed July 9, 1971, Ser. No. 161,145
Int. Cl. B60k 27/00
U.S. Cl. 180—105 R 3 Claims



A normally nonconducting input transistor receives an alternating signal having a frequency proportional to vehicle speed from a signal generator driven by a vehicle wheel. Positive portions of each cycle of the alternating signal switch the input transistor into its conducting state and a staircase converter connected to the input transistor converts the frequency of the signal into a voltage proportional to vehicle speed. The voltage is supplied to a trigger comprising a control transistor normally in the same nonconducting state as the input transistor and an output transistor connected in series with the winding of a solenoid that controls an item of vehicle equipment.

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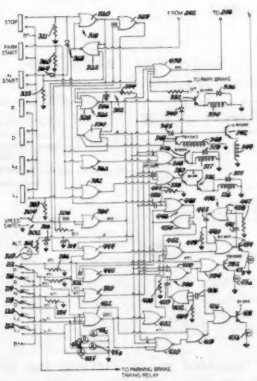
3,788,422

## ANTI-THEFT SYSTEM INCLUDING A PUSHBUTTON ELECTRONIC COMBINATION IGNITION LOCK AND TRANSMISSION SHIFT CONTROL

Lauren L. Bowler, Bloomfield Hills, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Oct. 27, 1972, Ser. No. 301,620
Int. Cl. B60r 25/06
U.S. Cl. 180—114 10 Claims



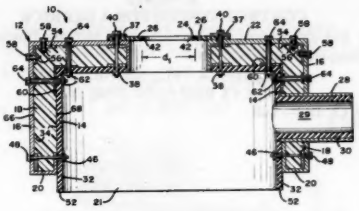
A pushbutton transmission selector mechanism and electronic lock and control logic for preventing unauthorized use of a motor vehicle by locking the ignition circuit and selector mechanism until a predetermined code number is entered by the operator through the selector mechanism. The PARK pushbutton selector controls locking of the vehicle steering column and automatic application of the vehicle parking brake assembly.

3,788,423

## PLENUM CHAMBER

Russell H. Nittinger, Morristown, and Donald O. Taylor, Parsippany, both of N.J., assignors to Allied Chemical Corporation, New York, N.Y.

Filed June 7, 1972, Ser. No. 260,565
Int. Cl. E21b 41/00
U.S. Cl. 181—33 K 14 Claims



A plenum chamber for covering and sealing a bore hole opening at the surface of the ground and for reducing the noise produced during a drilling operation is provided. The plenum chamber has a housing means comprising an open bottom and a closed top having a port therein which is adapted to receive a drill shaft. A vibration damping and sound absorbing means is disposed between and contacts a substantial portion of the external and internal walls of the housing means. Sealing means are connected to the housing means for maintaining the top and the bottom thereof in sealing engagement with the drill shaft and the surface of the ground, respectively. Drilling cuttings and dust particles carried up the bore hole by a compressed air stream are trapped by the plenum chamber in a highly efficient manner. Mechanical vibrational energy imparted to the housing means by impact of the drilling cuttings thereagainst is dissipated by the vibration damping and sound absorbing means. The external wall operates as a reflective barrier means to confine noise within the plenum chamber until it is eventually absorbed. As a result, the noise produced during operation of rotary drilling machines is substantially reduced.

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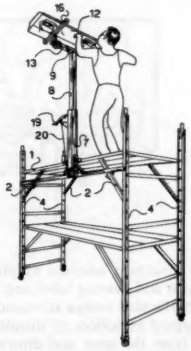
3,788,424

## HOIST ASSEMBLY FOR USE ON SCAFFOLDS

Serge Chabot, 904 Martel St., Marieville, Quebec, Canada

Filed Sept. 11, 1972, Ser. No. 288,064
Claims priority, application Canada, Feb. 17, 1972, 134978
Int. Cl. E04g 1/00
U.S. Cl. 182—129 2 Claims



A hoist assembly to be used on scaffolds to support a fixture such as a fluorescent unit for the installation thereof and in-

cluding a post holder, a post slidable upright into the post holder, a fixture carrying head rotatably mounted onto the upper end of the post, a winch to control the elevation of the post and carrying head, and brackets advantageously constructed and arranged to merely hook the hoist assembly to braces of the scaffold, thereby securing the same without any fastening, such as bolting, pinning or the like.

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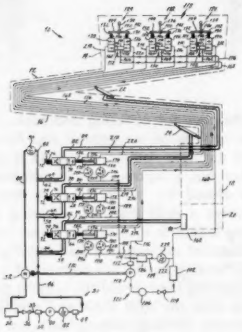
**3,788,425**
**CONTROL SYSTEM FOR A DERRICK**

**Roy Balogh, Ladue, Mo., assignor to McCabe-Powers Body Company, St. Louis, Mo.**

**Filed Apr. 24, 1972, Ser. No. 247,017**
**Int. Cl. B66f *11/04*; E04g *1/18***
**U.S. Cl. 182—148** **27 Claims**



A derrick having hydraulically operable remote control and main control systems wherein the remote control system is separate from and hydraulically non-communicative with the main control system. The remote control system employs a hydraulic fluid that differs from that used in the main control system such that the most desirable fluid characteristics for each system can be independently selected.

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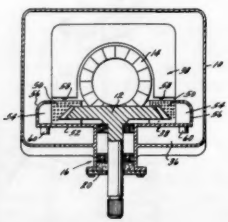
**3,788,426**
**LOW HEAT RISE GEARBOX**

**Thomas N. Hull, Jr., Marblehead, Mass., assignor to General Electric Company, Lynn, Mass.**

**Filed Jan. 21, 1970, Ser. No. 4,625**
**Int. Cl. F16n *7/26***
**U.S. Cl. 184—1 E** **7 Claims**

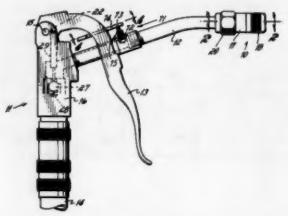


A gearbox structure adapted to preclude excessive heat input to the gear and bearing lubricant. The structure includes a stationary perforated screen surrounding at least one of the gears and adapted to collect oil droplets thrown tangentially and radially from the gear and direct them away from the gears to a scavenge outlet, from where the lubricant is transported to a lubricant supply pump and then recirculated through the gears and bearings.

**3,788,427**
**GREASE GUN AND COUPLING**

**Everett D. Fox, South Bend, Ind.; John P. Schaefer, Edwardsburg, Mich., and Raymond M. Leliaert, South Bend, Ind., assignors to Wheelabrator-Frye Inc., Mishawaka, Ind.**

**Filed June 9, 1972, Ser. No. 261,431**
**Int. Cl. F16n *3/12***
**U.S. Cl. 184—105 C** **20 Claims**



An improved high pressure grease gun and coupling unit for connecting the gun to a grease fitting. The coupling comprises a piston actuated collet type clamp which is normally spring biased to a position in which the collet is compressed. An axially movable valve element extends through the collet clamp and is engageable with the end of the grease fitting when the coupling is clamped onto a fitting. This valve is automatically opened by engagement with the fitting and is automatically closed by the pressure of the grease contained within the coupling when the coupling is removed from the fitting. The gun has a pressure relief valve and a pressure relief valve safety which prevents actuation of the gun whenever the relief valve is open.

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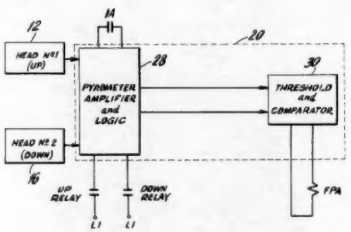
**3,788,428**
**ELEVATOR SAFETY CONTROL CIRCUIT FOR PREVENTING ELEVATOR DOOR FROM OPENING AT FLOOR WITH FIRE**

**David W. Fried, Kew Gardens, N.Y., assignor to Millar Elevator Industries, Inc., New York, N.Y.**

**Filed Dec. 22, 1972, Ser. No. 317,602**
**Int. Cl. B66b *13/24***
**U.S. Cl. 187—29 R** **15 Claims**



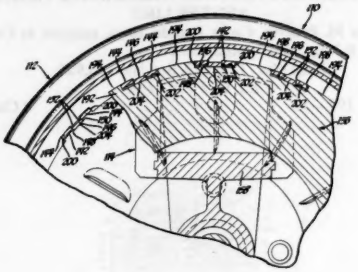

A sensor mounted on an elevator car senses the heat developed in the adjacent hallway as the car moves between the floors of a building. The heat sensor is connected to a relay circuit to operate a relay which prevents the car door from opening at any floor whenever excessive heat is sensed as a result of a fire in the hallway. That relay may also be employed to operate, when it is actuated in response to the detection of excessive heat, a fireman's return circuit to recall the elevator car to the lobby floor, and to provide an indication at the lobby floor of the existence and location of the fire.

3,788,429

## DISC BRAKE AND WHEEL ASSEMBLY

Frank W. Brooks, and Thomas D. Naismith, both of Dayton, Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed July 14, 1972, Ser. No. 271,660
Int. Cl. B60t 1/06
U.S. Cl. 188—18 A 1 Claim



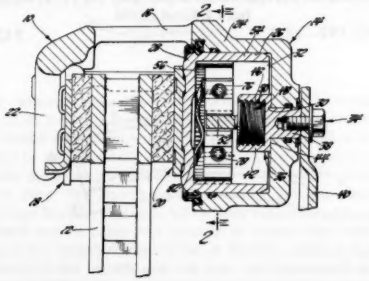
A disc brake and wheel assembly in which an annular brake disc has axially extending circumferentially spaced lands and grooves formed on its outer peripheral surface, and a brake disc support and drive member, provided as part of the wheel assembly, has a bell-like configuration, the generally radially extending portion of the member being mounted on the wheel assembly hub and the generally cylindrical portion of the member having circumferentially spaced projections received in the disc grooves and engaging the edges of the disc lands in rotary driving and axially relatively movable relation so that the disc is rotatably driven with the wheel assembly and is axially movable in relation thereto for brake adjustment. The brake caliper is of the fixed type, with one axially movable brake shoe and one fixed brake shoe arranged to frictionally engage opposite sides of the brake disc when actuated. A piston and cylinder arrangement in one side of the caliper housing is provided to move the movable brake shoe. It may also have a manually actuated mechanism so that the brake can also function as a parking brake, and may be provided with an automatic adjusting mechanism.

3,788,430

## DISC BRAKE ACTUATOR

Harmon C. Hurt, Dayton, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Aug. 17, 1971, Ser. No. 172,400
Int. Cl. F16d 55/26
U.S. Cl. 188—72.6 1 Claim



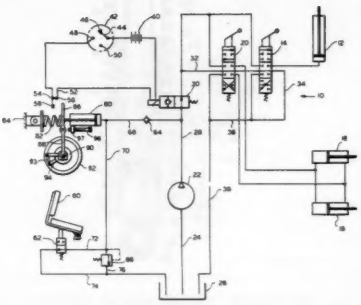
A hydraulically actuated disc brake includes a piston movable in a cylinder by hydraulic pressure. The brake also has a mechanically actuated mechanism which includes an expandable spline plate fitted within the piston and actuated by a cam to engage a spline on the interior of the plate. After such engagement, further movement of the mechanical actuating lever acts through a high lead screw arrangement to move the cam and the spline plate and the piston in a direction to mechanically apply the brake. Upon release, the interior splines retract radially to de-clutch from the piston.

3,788,431

## SEAT SAFETY BRAKE CONTROL SYSTEM

Donald W. York, Battle Creek, Mich., assignor to Clark Equipment Company, Buchanan, Mich.

Filed Aug. 10, 1972, Ser. No. 279,581
Int. Cl. B60t 7/02
U.S. Cl. 188—109 5 Claims



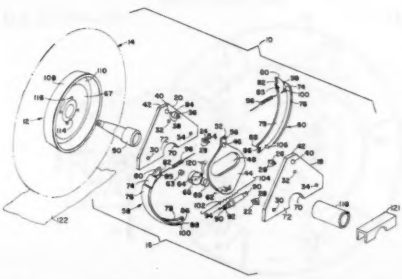
A vehicle operator's seat safety brake control combined in a vehicle hydraulic system responsive to apply the brake in the event that either the engine is not operating or the seat is not occupied, including interrelated solenoid valve, brake cylinder and vehicle ignition controls for insuring full hydraulic system pressure initially to release the brake by blocking off the vehicle hydraulic system from the brake control and for reconnecting the vehicle hydraulic system and brake control when the brake is released.

3,788,432

## ELECTRICAL BRAKE ASSEMBLY

Milford F. Marti, 608 B Chateau Dr. S.W., Huntsville, Ala.

Filed Oct. 13, 1972, Ser. No. 297,331
Int. Cl. F16d 65/34
U.S. Cl. 188—138 11 Claims



An electrical wheel brake assembly in which the webs of brake shoes and magnetically operated lever arm which

operates the brake shoes are held in a planer alignment between and supported by a pair of parallel spaced, interconnected, supporting plates, in turn supported by an axle, or spindle.

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**3,788,433**

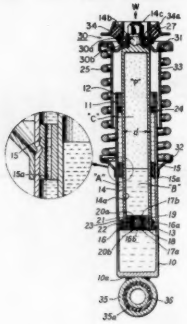
## TELESCOPIC SUSPENSION UNIT

**Teiji Katsumori, Yokohama, Japan, assignor to Tokico Limited, Kanagawa,ken, Japan**

**Continuation of Ser. No. 73,833, Sept. 21, 1970, abandoned. This application June 28, 1972, Ser. No. 266,963**

**Int. Cl. F16f** *9/19*

**U.S. Cl. 188—314** **7 Claims**



A suspension unit having a hollow cylinder and a hollow rod telescopically received therein is provided with fluid damping means in the end of the rod within the cylinder to control the flow of fluid between the cylinder and the rod. The cylinder and the end of the rod within the cylinder are filled with hydraulic fluid pressurized by a gas in the other end of the rod. The gas and hydraulic fluid may be in contact but to prevent formation of gas bubbles in the fluid a movable separator may be provided in the rod.

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**3,788,434**

## COUPLING

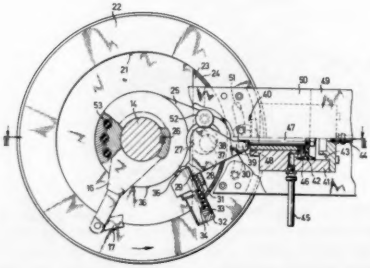
**Wilhelm Haberle, Industriegelande, Scheer, Germany**

**Filed Aug. 2, 1972, Ser. No. 277,251**

**Claims priority, application Germany, Aug. 7, 1971, P 21 39 637.2**

**Int. Cl. F16d** *13/02, 13/14*

**U.S. Cl. 192—26** **9 Claims**



A coupling arrangement for coupling a driven shaft with a driving shaft in at least one coupling position in a releasable fashion having a crank fixedly coupled with the driven shaft, an excenter lever rotatably journaling a brake shoe and a hollow shaft cooperating with the brake shoe, a spring device operating on the excenter lever for effecting closing of the coupling arrangement and, a stopping arrangement associated with the excenter lines.

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**3,788,435**

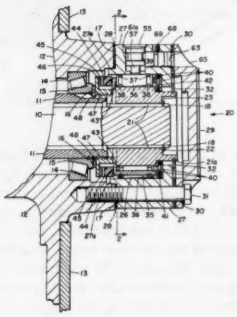
## AUTOMATIC HUB FOR FOUR WHEEL DRIVE VEHICLES AND THE LIKE

**Clarence M. Prueter, Cedar Rapids, Iowa, assignor to Cutlas Gear & Mfg., Inc., Vinton, Iowa**

**Filed Mar. 13, 1972, Ser. No. 233,928**

**Int. Cl. F16d** *41/08*

**U.S. Cl. 192—35** **4 Claims**



An automatic hub for each of the optionally driven wheels of a vehicle employs an annular brake shoe, axially spring loaded, to retard rotation of a sprag carrier relative to a pair of inner and outer clutch members, between which the sprag carrier operates, in order to cause the sprags to lock the wheels to their axles only when the latter are positively driven in either direction. The hub additionally incorporates a separate assembly which causes the sprags to lock the wheels to their axles on the overrun as well as when the axles are driven.

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**3,788,436**

## WEAR RESISTANT GUIDES FOR CLUTCH SHOE

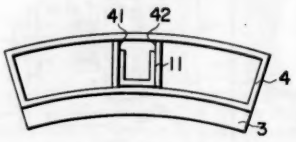
**Eisuke Sugahara, Akabanedai, Kita-ku, Tokyo, Japan**

**Filed June 9, 1972, Ser. No. 261,465**

**Claims priority, application Japan, July 10, 1971, 46/60786**

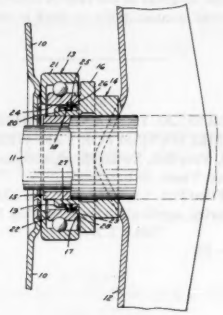
**Int. Cl. F16d** *25/04*

**U.S. Cl. 192—88 B** **3 Claims**



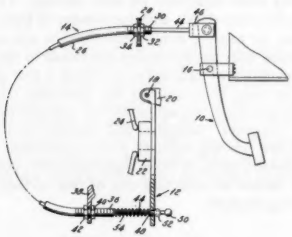

An air clutch is characterized in having abrasion resistant treatment of the guide walls containing the torque bar in a frictional contact element made of aluminum alloy.

3,788,437
CLUTCH RELEASE BEARING
John W. A. Camp, Colchester, England, assignor to Ford Motor Company, Dearborn, Mich.
Filed Jan. 21, 1972, Ser. No. 219,654
Claims priority, application Great Britain, Feb. 4, 1971, 3,862/71
Int. Cl. F16d 23/14, 27/00
U.S. Cl. 192—98 5 Claims



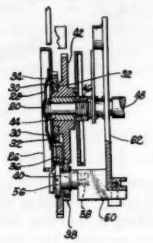
A clutch release mechanism having a self-centering clutch release bearing assembly. The bearing assembly has one portion engaging the clutch release fingers of a clutch pressure plate assembly and another portion engaging a bearing carrier. A split spring ring is interposed between the bearing and the carrier. The bearing is supported for limited radial movement and the spring urges the bearing into engagement with the bearing carrier.

3,788,438
CLUTCH ACTUATING MECHANISM WITH AUTOMATICALLY DETERMINED FREE PLAY
Frederick Reno, 26629 Dow St., Detroit, Mich.
Filed Dec. 6, 1972, Ser. No. 312,443
Int. Cl. F16d 21/04; G05g 1/14
U.S. Cl. 192—110 R 8 Claims



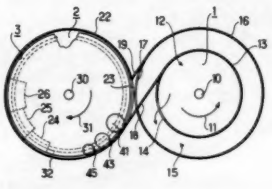
The present invention relates to a clutch actuating mechanism having a Bowden wire assembly interconnecting a clutch pedal and a clutch release lever. The mechanism is constructed to automatically establish an appropriate amount of free play in the system upon actuation of the clutch pedal for the first time. The Bowden wire assembly includes a tubular sheath that has one end secured to body structure adjacent to the pedal and its other end secured to chassis structure adjacent to the clutch release lever. A flexible cable is slidably supported in the sheath and has one end connected to the clutch pedal. The other end of the cable has spaced apart balls which form stop members secured to it. The outer ball is rigidly affixed to the cable and the inner ball is slidable on the cable when subjected to a force that exceeds a predetermined minimum value. The inner ball engages the clutch release lever. Upon installation, the sheath is attached to the body and the chassis in a manner to eliminate any slack or free play in the system. When the clutch pedal is depressed, the force will be transmitted to the inner ball causing it to slide into engagement with the outer ball. Free play will be automatically established in the mechanism by the displacement of the inner ball.

3,788,439
EXTENDED TIME METER CONSTRUCTION
Ronald J. Lugowski, Rolling Meadows, and Rinaldo Sciacero, Arlington Heights, both of Ill., assignors to Qonaar Corporation, Elk Grove Village, Ill.
Filed Nov. 21, 1972, Ser. No. 308,547
Int. Cl. G07c 1/30
U.S. Cl. 194—61 9 Claims



A coin controlled construction for obtaining the purchase of time on a timer mechanism adapted for recording many hours of time. The operation of the timer mechanism is provided by means of a winding ring movable in response to the insertion of coins. The drive shaft of the timer mechanism is connected to a drive gear through a one-way clutch. The drive gear is in turn operatively connected to the winding ring, and the clutch provides for rotation of the timer shaft upon movement of the winding ring. The clutch then permits the return of the winding ring and drive gear to the starting position whereby multiple winds of the gear shaft can be accomplished through repeated introduction of coins.

3,788,440
COIN OPERATED APPARATUS
Roger Propice, Courbevoie, and Carlos Da Rocha, Choisy-le-Roi, both of France, assignors to Compagnie Industrielle Des Telecommunications Cit-Alcatel, Paris, France
Filed Oct. 20, 1971, Ser. No. 190,847
Claims priority, application France, Oct. 23, 1970, 7038391
Int. Cl. G07f 3/00
U.S. Cl. 194—99 7 Claims

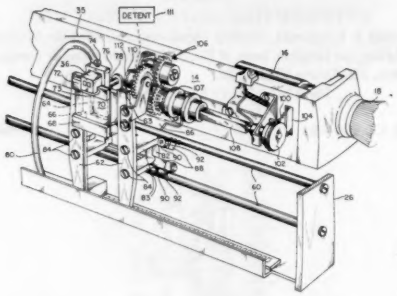


A coin collecting and counting device includes a turntable which directs coins by centrifugal force from a coin inlet to a coin path leading from the turntable periphery to respective coin outlets having coin validators for each type of coin along the path of coin movement.

### 3,788,441
### EDITING TYPEWRITER WITH CORRESPONDING MOTION OF RECORDER ELEMENTS

**Perry H. Vartanian, Jr., Woodside; Michael J. Markakis, and Carl P. Anderson, both of Palo Alto, all of Calif., assignors to SCM Corporation, New York, N.Y.**

**Filed Apr. 26, 1971, Ser. No. 137,165**
**Int. Cl. B41j**
**U.S. Cl. 197—1 R** **11 Claims**



A machine is disclosed for simultaneously making type-written and magnetic records, for editing magnetic records, and for automatically making typewritten record copies of edited or unedited magnetic records. The editing typewriter comprises typewriter elements including a platen and printing type spaced from the platen. Means are provided for moving the typewriter elements into and out of positions of mutual contact and for laterally stepping one of the typewriter elements with respect to the other. The editing typewriter also comprises magnetic recorder elements including a magnetic head and a magnetic record support. Structural means are provided "pantographically' linking one of the typewriter elements with one of the magnetic recorder elements whereby one of the magnetic recorder elements may be stepped with respect to the other of the magnetic recorder elements when one of the typewriter elements is laterally stepped with respect to the other of the typewriter elements.

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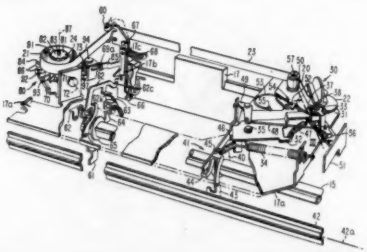
### 3,788,442
### ERASE RIBBON FEED

**Robert W. Lehnhardt, Jr., and John O. Schaefer, both of Lexington, Ky., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed June 27, 1972, Ser. No. 266,764**
**Int. Cl. B41j** *29/16*
**U.S. Cl. 197—181** **6 Claims**



An erase ribbon feed mechanism incrementally feeds ribbon both before and after, but not during print impact to break an adhesive type erase ribbon loose from adjacent structures such as a card holder to which it may have become attached. The mechanism is thus made suitable for feeding an adhesive erase ribbon without creating shedding conditions that would make it unsuitable for feeding a cover-up type erase ribbon. Preferably, the card holder is made of polytetraflouroethylene and includes surface contact minimizing ridges adjacent the path of the erase ribbon. Where the ribbon lift action increases the span length of the erase ribbon, the feed occurring after impact is designed to take-up ribbon at a rate at least as great as the rate of decrease in ribbon span length to prevent accumulation of slack in the ribbon span.

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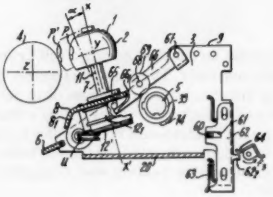
### 3,788,443
### CHARACTER SELECTION AND IMPRESSION CONTROL MECHANISM FOR TYPEWRITER

**Ulrich Menzi, Yverdon, Switzerland, assignor to Paillard S.A., Sainte-Croix, Vaud, Switzerland**

**Filed Feb. 11, 1972, Ser. No. 225,532**
**Claims priority, application Sweden, Feb. 12, 1971, 2119/71**
**Int. Cl. B41j** *1/32*
**U.S. Cl. 197—16** **9 Claims**



A character selection and impression control mechanism is provided with an integrated coded mechanical system of transmission for the orders controlling the character selection, the shift, the printing velocity and the "No-print" functions, between the frame of a typewriter and converter or decoding means supported on the carriage and controlling the devices performing these functions on said carriage. This system of transmission comprises a definite number of bails mounted on said frame for relative movements thereon and each adapted to cooperate with control means supported by the carriage for all the positions of said carriage along a line of writing. A number of said bails control the decoding device for the character selection and an additional bail controls the device for the "No-print" function. Still another bail controls the high and low printing velocity. One or the other of these two last mentioned bails, or both simultaneously, control equally the shift device for selecting one of two surface portions on the printing element.

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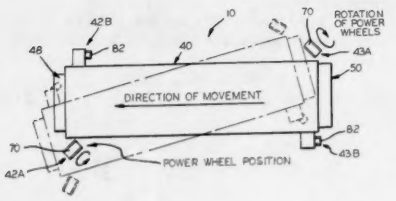
### 3,788,444
### STEERING CONTROL FOR POWER DRIVEN MOBILE CONVEYORS

**Joseph E. McWilliams, 1345 Canterbury Ln., Glenview, Ill.**

**Filed Oct. 24, 1972, Ser. No. 299,680**
**Int. Cl. B60k** *17/30, 17/34;* **B65g** *67/04*
**U.S. Cl. 198—2** **7 Claims**

A steering control arrangement for power driven mobile conveyors in which the conveyor frame is provided with a pair of wheels at each end of same, which one wheel of each pair is power driven to move the conveyor frame, and is selectively power steerable about a vertical axis through a range of 180° or more relative to the transverse dimension of the frame, and

the other wheel of each pair is of the idler caster type. The power steerable wheels may be positioned transversely, longitudinally, or diagonally of the conveyor frame to move the conveyor laterally or longitudinally of same, or turn the conveyor in either direction or end for end.

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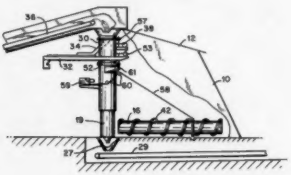
**3,788,445**
**APPARATUS FOR RECOVERING BULK MATERIAL FROM A PILE**

**Francis Postel-Vinay, Paris, France, assignor to Fives Lille-Cail, Paris, France**

**Filed May 4, 1972, Ser. No. 250,140**
**Claims priority, application France, May 4, 1971, 7115937**
**Int. Cl. B65g** *65/46*
**U.S. Cl. 198—36** **7 Claims**



An apparatus for recovering bulk material from a pile having a center and a face from which the material is to be recovered comprises a tubular screw conveyor rotatable about its axis and extending in a radial plane from the center of the pile. A central column coaxial with the center and rotatable about its axis supports a pivot for one end of the screw conveyor for movement about a horizontal axis, and a hoist carried by the column supports the other end of the conveyor.

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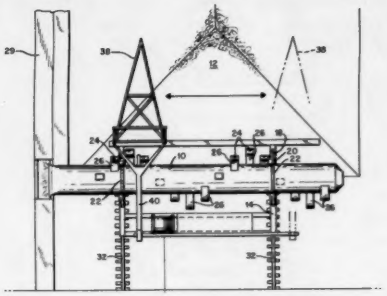
**3,788,446**
**APPARATUS FOR RECOVERING BULK MATERIAL FROM A PILE**

**Francis Postel-Vinay, Paris, France, assignor to Fives Lille-Cail, Paris, France**

**Filed May 4, 1972, Ser. No. 250,141**
**Claims priority, application France, May 4, 1971, 7115936**
**Int. Cl. B65g** *59/00*
**U.S. Cl. 198—36** **4 Claims**

An apparatus for recovering bulk material from the face of a pile comprises a rotatable tube disposed with its axis parallel to the face of the pile. The tube wall has a plurality of ports and a like plurality of buckets are affixed to the outer surface of the tube wall in communication with respective ports. At least one helical discharge channel in the inner surface of the tube wall receives the material recovered by the buckets and passed through the ports into the interior of the tube to convey this material to an open discharge end of the tube.



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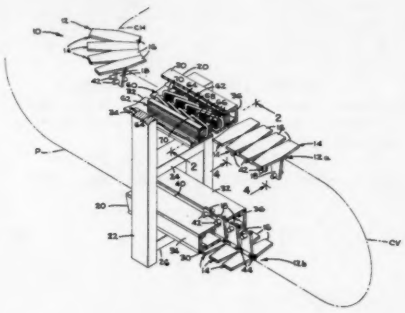
**3,788,447**
**LINEAR MOTOR CONVEYOR**

**Louis J. Stephanoff, Indianapolis, Ind., assignor to FMC Corporation, San Jose, Calif.**

**Filed July 3, 1972, Ser. No. 268,389**
**Int. Cl. B65g** *17/46, 23/00;* **H02k** *41/02*
**U.S. Cl. 198—41** **13 Claims**



A linear motor conveyor has an endless guide support in which stators of linear motors are housed. Conveyor segments are pivotally linked together in an endless loop for articulating movement, either horizontally or vertically, or both, along the endless path defined by the guide support. The conveyor segments, which have an armature portion extending through slots in the guide support, are retained in the guide support in every orientation of the conveyor by laterally extending portions including a load bearing portion. The conveyor is propelled along the guide track by virtue of the electromagnetically coupling of the linear motor stators with the armature portions of the conveyor segment loop.

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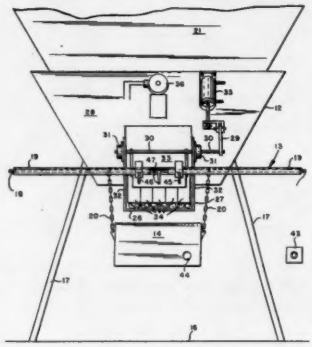
**3,788,448**
**OYSTER HANDLING APPARATUS**

**William H. Harris, Rt. 1, Box 96, Chester, Md.**

**Filed Jan. 24, 1973, Ser. No. 326,287**
**Int. Cl. B65g** *47/19*
**U.S. Cl. 198—56** **5 Claims**

A material handling apparatus particularly adapted for the handling of oysters or like shell sea food, whereby the oysters

or the like are delivered into a hopper having a discharge located in the bottom wall thereof. An endless conveyor having a plurality of buckets suspended therefrom travels in a closed path and when a bucket which is empty of oysters



passes under the bottom discharge of the hopper, a flow of oysters is directed into the bucket. On the other hand, if the bucket is already filled with oysters, the same continues on its path without receiving any additional oysters from the bottom discharge of the hopper.

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**3,788,449**

## NOVEL VIBRATORY CONVEYOR

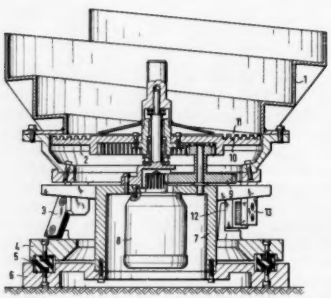
**Waldemar Baberowski, and Karl Spiess, both of Herzogenaurach, Germany, assignors to Industriewerk-Schaeffler OHG, Herzogenaurach, Germany**

**Filed Sept. 20, 1972, Ser. No. 290,492**

**Claims priority, application Germany, Dec. 2, 1971, P 21 59 718.2**

**Int. Cl. B65g** *27/02, 27/34*

**U.S. Cl. 198—107** **4 Claims**



A novel vibratory conveyor comprising a conveyor bowl capable of periodic rotational and vertical vibrations, the bowl bottom being separate from its wall, the bowl wall supporting a helical conveyor track being connected by linkage springs to a counter vibrating mass supported on a fixed base plate, the bottom of the conveyor bowl being rotatably mounted on said base plate.

**3,788,450**

## DEVICE FOR TRANSPORTING CONTAINERS

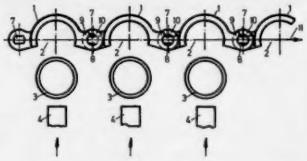
**Edgar Tschunt, Erlangen, and Werner Dittrich, Nurnberg, both of Germany, assignors to Siemens Aktiengesellschaft, Erlangen, Germany**

**Filed Nov. 9, 1971, Ser. No. 197,110**

**Claims priority, application Germany, Nov. 18, 1970, P 20 56 664.7**

**Int. Cl. B65g** *15/00*

**U.S. Cl. 198—131** **2 Claims**



A transporting device for containers, particularly containers carrying liquid tests, consists of a chain the links of which have recesses for receiving the containers. The invention is particularly characterized in that each recess of links consisting of resilient material, has a side opening the width of which is somewhat smaller than the container, so that the container is fixed in the recess when it is pressed through the opening.

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**3,788,451**

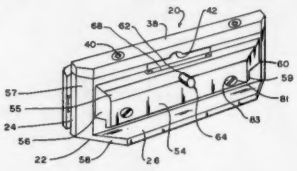
## RECEPTACLE CARRIER FOR AN AUTOMATIC CONVEYING SYSTEM

**Robert L. Cahn, 257 Grand Central Ave., Amityville, N.Y.**

**Filed Feb. 28, 1972, Ser. No. 229,735**

**Int. Cl. B65g** *17/00*

**U.S. Cl. 198—131** **9 Claims**



A carrier for an automatic conveying system includes an L-shaped support for a receptacle such as a tray. A flat plate movably mounted on the L-shaped plate is biased downwardly to engage the receptacle with a pushbuttom operated elevation means for raising the flat plate against the bias to release the receptacle.

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**3,788,452**

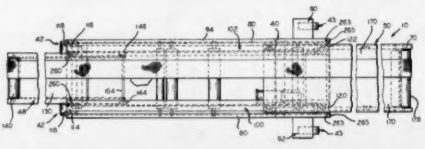
## BALANCED EXTENDIBLE MOBILE CONVEYOR

**Joseph E. McWilliams, 1345 Canterbury Ln., Glenview, Ill.**

**Filed July 27, 1972, Ser. No. 275,791**

**Int. Cl. B65g** *15/00*

**U.S. Cl. 198—139** **5 Claims**



A balanced extendible mobile conveyor comprising a wheeled frame having a pair of oppositely directed retractable

frames at opposed ends thereof that are mounted and may be driven for balanced and synchronized extending and retracting movement inwardly and outwardly of the wheeled frame ends, a single conveyor belt trained over the top of slider beds defined by said wheeled and retractable frames and provided with slack take up and let out trailing means to automatically take up and let out belt slack as the retractable frames are moved inwardly and outwardly of the wheeled frame, and a reversable drive for driving the belt. The wheeled frame includes drive wheels for selectively driving and steering the wheeled frame between desired positions of operation.

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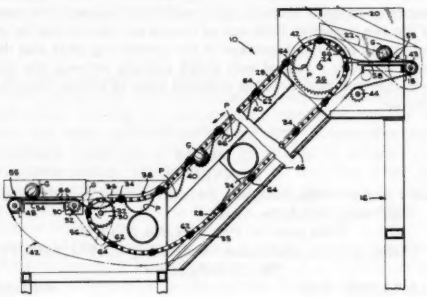
**3,788,453**

**INCLINED CONVEYOR FOR HANDLING FRAGILE ARTICLES**

**Robert E. Varney, Lakeland, Fla., assignor to FMC Corporation, San Jose, Calif.**

**Filed Sept. 1, 1972, Ser. No. 285,712**
**Int. Cl. B65g** *17/04*
**U.S. Cl. 198—153** **14 Claims**



An inclined conveyor for elevating or lowering relatively fragile articles, such as whole peeled grapefruit, includes an endless flexible draper belt which is mounted for rotation in an inclined plane. The upper run of the draper belt is arranged to be engaged at spaced locations by a series of transversely extending rods which are moved in an endless loop path within the endless loop path of the draper belt. The linear speed of the rods is less than that of the draper belt and the upper run of the draper belt has end portions which extend in generally horizontal planes at the upstream and downstream ends of the endless loop path of the rods whereby a pendant pocket is caused to be gradually formed in the draper belt between each pair of adjacent rods which pocket is then elevated or lowered solely by means of the movement of the rods; thus, the fragile articles can be continuously supported by the belt while they are transferred to a different elevation without being unduly jostled or otherwise disturbed so as to cause damage thereto.

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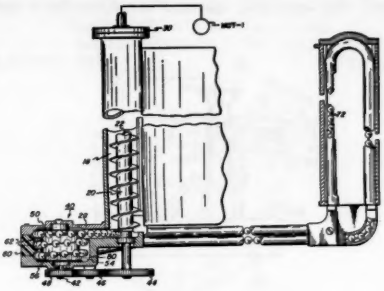
**3,788,454**

**CHAIN BEAD DRIVE APPARATUS**

**William C. Emerson, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Sept. 15, 1972, Ser. No. 289,514**
**Int. Cl. B65g** *19/00*
**U.S. Cl. 198—168** **3 Claims**

An improved drive apparatus for transporting particulater material including a bead chain and capstan. The capstan is constructed of a resilient cylindrical member formed with a set of teeth on one end or rim to contact and positively drive



the bead chain. The chain is wrapped around the member a plurality of times such that slight slippage of the beads can occur without binding.

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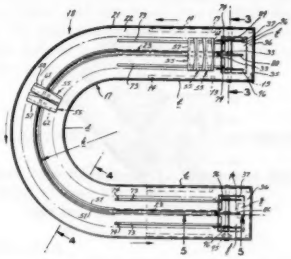
**3,788,455**

**CURVED-PATH SLAT BELT CONVEYOR**

**George W. Dieckmann, Jr., Riverview Gardens, Mo., assignor to Food Equipment Corporation, St. Louis, Mo.**

**Filed May 10, 1971, Ser. No. 141,484**
**Int. Cl. B65g** *17/00*
**U.S. Cl. 198—182** **3 Claims**



A sanitary conveyor of the overlapping slat belt type operates over a curved path of small radius and with minimum wear. Ordinary link chain is used in the conveyor drive. Its alternate links are held vertically by guide blocks beneath each slat, which glide in the central slot of the conveyor bed. The guide blocks and the links they hold vertically serve to present the intermediate links horizontally, for engaging the drive sprockets. Each link so held horizontally is free to pivot angularly relative to the adjacent vertical links, permitting turns of small radius. Provisions are made to minimize friction of the travelling slats and guide blocks.

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**3,788,456**

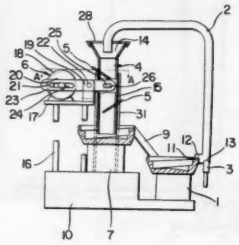
**METHOD AND APPARATUS FOR AUTOMATICALLY SEPARATING ENTANGLED SPRINGS**

**Keitaro Ashibe, c/o Tenryu Seiki Co., Ltd., 15853 Akaho, Nagano-ken, Komagane-shi, Japan**

**Filed Feb. 24, 1972, Ser. No. 228,883**
**Claims priority, application Japan, Feb. 27, 1971, 46-10286**
**Int. Cl. B65g** *27/00*
**U.S. Cl. 198—220 A** **4 Claims**

A method and apparatus for automatically separating entangled springs from one another, wherein the separating

operation of entangled springs is effected by dashing them against plates arranged fixedly within a tubular separating housing in vertically spaced and zigzag relation to one another. The separating operation is followed by a further



sorting of the springs to remove the individual springs which have been separated and to return the unseparated springs to a vibratory bowl sorter and feeder which has a connection to a pneumatic conveyor for returning springs still unseparated back to the separating housing.

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**3,788,457**

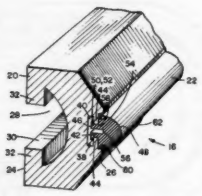
**GUIDE RAIL FOR A CONVEYOR**

**Frank Valentino, Jr., Chicago, Ill., assignor to National Can Corporation, Chicago, Ill.**

**Filed Oct. 24, 1972, Ser. No. 300,105**

**Int. Cl. B65g** *15/60*

**U.S. Cl. 198—204** **4 Claims**



A guide rail for conveyors such as endless conveyors for containers, which includes a straight, solid bar having a mounting surface and an opposite guiding surface defining a lengthwise groove with an outer constricted portion, and an insert piece configured to be mated within the groove and having a slot in the inserted portion to facilitate insertion and removal and presenting a smooth protruding surface to provide a rail facing. Other features relate to a universal mounting groove in the surface opposite the guiding surface of the bar, and to a recess of the edges of the protruding surface of the insert piece.

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**3,788,458**

**CONVEYOR TROUGH CONNECTING JOINT CONSTRUCTION**

**Gert Braun, and Ernst Braun, both of Essen-Heisingen, Germany, assignors to Halbach & Braun, Wuppertal-Barmen, Germany**

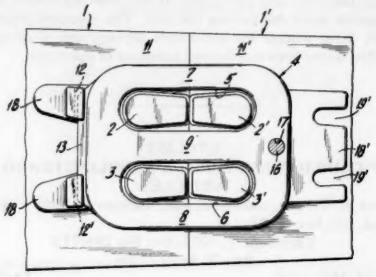
**Filed Jan. 12, 1973, Ser. No. 323,049**

**Claims priority, application Germany, Jan. 19, 1972, P 22 02 399.0**

**Int. Cl. B65g** *17/06, 19/18*

**U.S. Cl. 198—204** **4 Claims**

A conveyor trough connecting joint comprises two conveyor sections arranged in end-to-end abutting relationship and which have walls, such as the side walls, which carry joining means in the form of a pair of spaced apart tenons carried by each section, and with the corresponding tenons of one section being aligned and opposed to corresponding tenons of the other section. The sections are held together by a connecting plate having double eye openings and which is arranged to em-



brace the tenons of adjacent trough sections with the opposed tenons of adjacent sections being positioned in respective ones of the eye openings. Both sets of tenons are surrounded by an upper and lower web portion of the connecting plate and the plate includes a central web which extends between the eye openings and embraces the opposed pairs of tenons from the interior.

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**3,788,459**

**CONVEYOR**

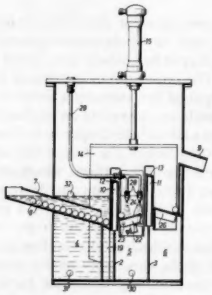
**Kurt Anders Holm, Skoghall, Sweden, assignor to Uddeholms Aktiebolag, Uddeholm, Sweden**

**Filed June 16, 1972, Ser. No. 263,654**

**Claims priority, application Sweden, July 6, 1971, 8869/71**

**Int. Cl. B65g** *25/04*

**U.S. Cl. 198—218** **6 Claims**



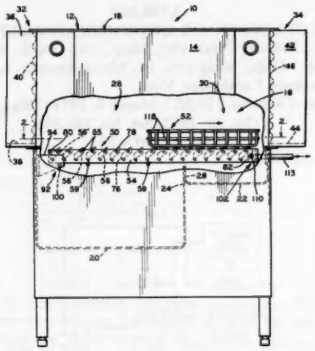
A conveyor is conveying ballbearing balls or the like without mutual contact through an apparatus for surface treatment as degreasing of the balls wtih a solvent. The conveyor comprises several stationary and movable support members, the latter being arranged between the stationary members and each member having surface which is inclining downwardly in the direction of transport. At least one of the movable support members is pivotably mounted so that its surface can alter its inclination to incline upwardly in the direction of transport. Spray guns are spraying solvent over a ball, which is rolling back and forth on the surface of the pivotably mounted member and the ball is thus treated on all sides.

3,788,460

## PAWL BAR ASSEMBLY

Eugene Messersmith, Tampa, Fla., assignor to Synthane-Taylor Corporation, Valley Forge, Pa.

Filed May 17, 1972, Ser. No. 254,180
Int. Cl. B65g 25/08
U.S. Cl. 198—221 7 Claims



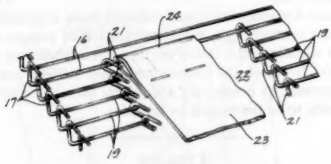
A removable pawl bar assembly is disclosed for use in dishwashing apparatus. The pawl bar mechanism is disposed in the dishwasher housing for reciprocating movement relative to inlet and outlet ends of the housing and is cooperable with receptacle means for articles to be cleaned to advance the receptacle means, intermittently, in the direction from the inlet toward the outlet end of the housing. Means is provided to support the opposite ends of the pawl bar assembly in a manner whereby the assembly can be reciprocated within the housing and is readily removable from the housing simply by lifting the assembly from the support means and withdrawing the assembly through an access opening in the housing.

3,788,461

## SELF-CLEANING ENDLESS BELT

Theodore Friesen, 301 Colby Ave., Oakley, Kans.

Filed July 17, 1972, Ser. No. 272,534
Int. Cl. B65g 45/00
U.S. Cl. 198—229 6 Claims



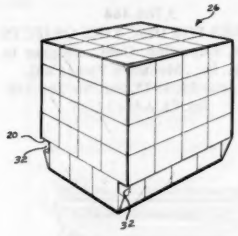
An endless belt having an upper train and a lower train and comprised of a plurality of spaced, parallel links running transversely to the direction of movement of the belt, and with at least one opening formed intermediate the side edges of the belt and having in conjunction therewith a single piece of material pivotally connected across the leading edge of the opening so as to pivot about an axis parallel to the transverse links, such that when the piece of material is riding about the upper train it covers the opening to aid in transporting that which is being moved by the belt, and when riding about the lower train it drops away from the opening and exposes the interior of the belt.

3,788,462

## UNITIZED PALLETLESS LOAD

John H. Meincer, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed Feb. 25, 1971, Ser. No. 118,664
Int. Cl. B65d 65/20, 71/00, 85/62
U.S. Cl. 206—65 S 12 Claims



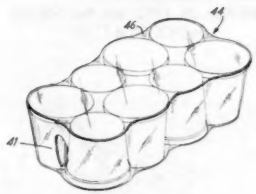
A unitized, palletless plurality of articles grouped and arranged in transportable or storable units. A first layer of articles is built atop a strip of heat-shrinkable thermoplastic material. Subsequent layers, all of an equal circumference and of greater circumference than the first layer, are built atop the first layer. At least two free ends of the bottommost strip are tucked beneath one of the subsequent layers. When the layers have reached the desired height, a heat-shrinkable thermoplastic material, preferably in the form of a bag, is placed around the entire load. The load, so enclosed, is exposed to heat to cause the material to shrink, also causing the bottom strip to fuse into the overall wrapping. The result is a tightly confined unitized and stabilized load suitable for storage or shipment. The load may be lifted and transported by a fork lift at the ledge defined by the overhang of all of the upper layers over the first layer.

3,788,463

## BUNDLING METHOD AND ARTICLE PRODUCED THEREBY

Stanley Ruff, New Rochelle, N.Y., assignor to Maryland Cup Corporation, Owings Mills, Mich.

Filed Jan. 31, 1972, Ser. No. 222,097
Int. Cl. B65d 65/16, 85/62
U.S. Cl. 206—65 S 17 Claims



In order to facilitate the handling of merchandise and to protect it during transit from the manufacturer to the wholesaler, jobber and retailer, an improved bundling method is provided for unitizing a plurality of light weight identical article-filled containers, each of which has at least one flat surface and preferably two parallel flat surfaces. The containers are delivered by a belt conveyor to a feed chute from which they are fed in a neat compact array into a bag made from a shrink film, e.g., a biaxially oriented heat shrinkable film. The bag with the ordered array of containers loosely filling it then is conveyed through a heated shrink tunnel wherein the bag is

shrunk about the array to tightly enshroud and securely retain the containers in their prearranged compact formation. Prior to shrinking the bag has an open mouth and a closed bottom and the open mouth extends beyond the formation of containers inserted in the bag. Upon shrinking the bag mouth constricts on the formation to effectively close the mouth of the bag. Any construction of bag may be used.

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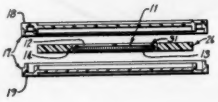
**3,788,464**

## HOLDER FOR DISC-LIKE OBJECTS

**James R. Skinner, Cupertino, Calif., assignor to M. V. Engineering & Mfg., Inc., Mountain View, Calif.**

**Filed June 26, 1972, Ser. No. 265,958**
**Int. Cl. A45c *11/28***
**U.S. Cl. 206—.82** **7 Claims**



Holder for a disc-like object having a diameter which can vary within a predetermined range and having generally planar first and second spaced parallel surfaces and a circular edge extending at right angles to said generally planar surfaces of said object. The holder comprising a member having substantially planar first and second spaced parallel surfaces with said member having a generally circular hole therein extending through both of said surfaces for receiving one of said disc-like objects. The hole has a size so as to be able to accommodate an object of the largest diameter. The member is formed with at least three object-retaining portions extending into the hole which are adapted to be engaged by the edge of the object disposed in the hole to retain the object in said hole in said member. The member is formed of material whereby the portions can be deformed by said object as it is inserted to accommodate objects of varying diameters while retaining the object within the hole in the member.

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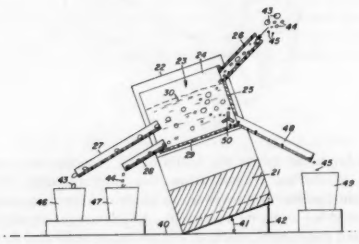
**3,788,465**

## DEVICE AND PROCESS FOR MAGNETO-GRAVIMETRIC PARTICLE SEPARATION USING NON-VERTICAL LEVITATION FORCES

**George W. Reimers, Burnsville; Stephen A. Rholl, and Sanaa E. Khalafalla, both of Minneapolis, all of Minn., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.**

**Filed Apr. 28, 1972, Ser. No. 248,705**
**Int. Cl. B03c *1/30***
**U.S. Cl. 209—1** **18 Claims**



A volume of magnetic fluid is caused to function as a density spectrograph by impressing a magnetic field upon the fluid in an orientation such that non-vertical levitation forces are developed upon particles immersed in the fluid. Particles are separated according to their density by passing them through the magnetic fluid. Interaction of particles within the fluid with the vector sum of gravitational and levitation forces causes each particle to travel a trajectory through the fluid characteristic of its density. Particles exit from the fluid at different locations, according to their density, thus allowing collection of density-graded fractions.

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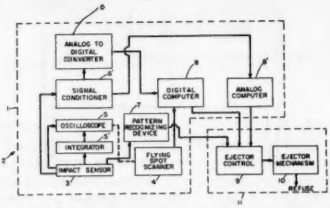
**3,788,466**

## IMPACT SENSOR AND CODER APPARATUS

**David G. Wilson, Cambridge, Mass., and Ora E. Smith, Cincinnati, Ohio, assignors to Massachusetts Institute of Technology, Cambridge, Mass.**

**Division of Ser. No. 120,857, March 4, 1971. This application Oct. 10, 1972, Ser. No. 296,396**
**Int. Cl. B07c *5/34***
**U.S. Cl. 209—79** **4 Claims**




Impact sensor and coder apparatus for use in a materials-sorting system. The embodiment described in greatest detail includes a movable rigid body adapted to strike individual pieces of the materials. An accelerometer associated with the rigid body measures the rate of deceleration of the rigid body, as a function of time, in terms of a voltage signal waveform. The waveform thus derived is compared with a group of typical waveforms to determine which of the waveforms of the group conforms most closely to that of the sample, thereby to identify the sample.

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**3,788,467**

## FLOTATION PROCESS FOR RECOVERING MOLYBDENUM

**Michael Francis Werneke, Milford, Conn., assignor to American Cyanamid Corporation, Stamford, Conn.**

**Filed Apr. 27, 1972, Ser. No. 248,316**
**Int. Cl. B03d *1/06***
**U.S. Cl. 209—167** **3 Claims**

A process for recovering molybdenite from a metallurgical concentrate comprising a major proportion of copper sulfide and other sulfides and a minor portion of molybdenum sulfide is provided, in which the copper and other sulfides are selectively depressed by employing a xanthate thereby enabling the molybdenite to be recovered by flotation.

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**3,788,468**

## PROCESS FOR INCREASING OXYGEN DIFFUSIVITY

**John L. Gainer, Charlottesville, Va., assignor to The University of Virginia, Charlottesville, Va.**

**Filed May 1, 1973, Ser. No. 356,110**
**Int. Cl. C02b *3/08***
**U.S. Cl. 210—59** **3 Claims**

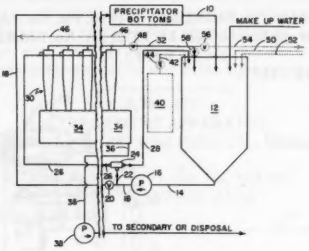
Diffusivity of oxygen in aqueous solutions has been increased by the introduction of a water soluble carotenoid into the solutions. Carotenoids have been found to be useful for increasing the diffusivity of oxygen in the blood, and hence are useful for the reduction of local hypoxia, which is believed to be one of the factors in development of atherosclerosis. The administration of these materials has resulted in reducing the incidence of atherosclerosis in mammals.

3,788,469

## PROCESS FOR REMOVING ASH FROM PRECIPITATORS

Ernest G. Hirsch, Foxboro, and George L. Nelson, Westwood, both of Mass., assignors to New England Power Company, Westboro, Mass.

Filed July 13, 1972, Ser. No. 271,498
Int. Cl. B01d *21/26*
U.S. Cl. 210—73 16 Claims



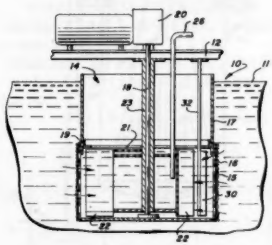

A process for removing fuel ash from precipitator bottoms circulates water through the bottoms to carry off the ash, then passes the water at least in part through a hydrocyclone separation stage to produce a major overflow fraction of reduced solids content and a minor overflow fraction of increased solids content, and recirculates the water withdrawn from the bottoms less the underflow fraction back through the bottoms at a rate to maintain the solids concentration less than that at which substantial settling out of solids will occur. Preferably, the recirculation is continuous, and the underflow from said hydrocyclone separation stage is subjected to secondary stage hydrocyclone separation from which the underflow may be subjected to tertiary stage solids separation, the overflow from one or both further separation stages being recirculated.

3,788,470

## METHOD OF FILTERING LIQUIDS

John P. Pelmulder, Saratoga; Cornelius Meister, San Jose, both of Calif., and Darrell W. Monroe, Deerfield, Ill., assignors to FMC Corporation, Chicago, Ill.

Filed Sept. 20, 1971, Ser. No. 181,760
Int. Cl. B01d *33/02*
U.S. Cl. 210—78 10 Claims



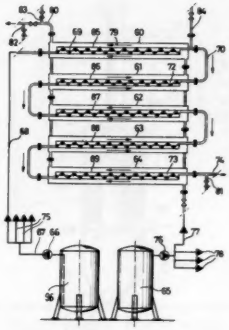
The method of straining suspended solids by rotating a filter at a high peripheral speed that is effective to maximize the effects of certain flow conditions in a liquid adjacent the filter. A layer is formed immediately adjacent the screen, which contains significantly less particulate matter than is contained in the suspension spaced from the screen to provide for a high throughput of the liquid being filtered that has a high percentage of the solids removed therefrom.

3,788,471

## DIALYSIS APPARATUS

Paul Buchmann, Basel, Switzerland, and Monique Beringer, St. Louis, France, assignors to Solco Basel AG, Basel, Switzerland

Division of Ser. No. 48,113, June 22, 1970, Pat. No. 3,672,509.
This application Feb. 2, 1972, Ser. No. 223,036
Int. Cl. B01d *31/00, 13/00*
U.S. Cl. 210—94 2 Claims



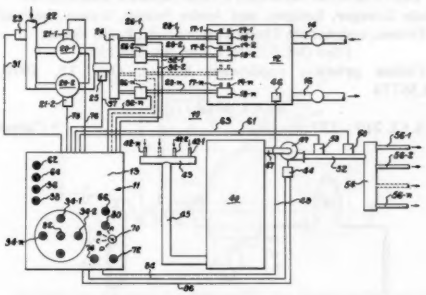
A dialysis apparatus having at least one unit in which an outer generally cylindrical tube forms a through-flow vessel closed at its ends with caps provided with inlet and outlet conduits for the fluid. A semipermeable foil or membrane forms an inner coaxial tube and is supported within the outer tube while having means for passing another liquid through its interior. The dialysis unit may be ganged in banks connected in cascade, the banks being shiftable to afford access to the individual units for replacement or otherwise.

3,788,472

## WASTE WATER PROCESS TANK CONTROL FACILITY

William O. Boschen, Tenafly, and Otto A. Grieshaber, Pompton Lakes, both of N.J., assignors to Ralph B. Carter Company, Hackensack, N.J.

Filed Feb. 3, 1972, Ser. No. 223,188
Int. Cl. B01d *21/24*
U.S. Cl. 210—103 3 Claims



A control facility for a waste water process tank having a normal operating mode wherein the system shuts down and indicates "fault" on malfunction and provides a stepped, sequential trouble shooting procedure for determining the fault and provides for temporary operation or partial operation of the system until the fault is corrected. The system is directed toward use in waste water treatment plants which utilize liquid mixing or liquid mixing and heating tanks.

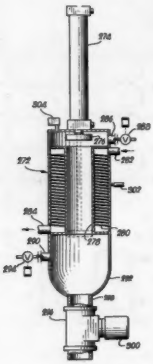
## 3,788,473
## PARTICLE SEPARATOR

Arthur S. King, 1710 Baltimore, Kansas City, Mo.

Division of Ser. No. 100,221, Dec. 21, 1970, Pat. No. 3,718,256, which is a division of Ser. No. 727,835, May 9, 1968, Pat. No. 3,585,122, which is a continuation-in-part of Ser. No. 613,616, Feb. 2, 1967, abandoned. This application Jan. 15, 1973, Ser. No. 323,750

Int. Cl. B01d *43/00*

U.S. Cl. 210—112 2 Claims



Particles are removed from fluids, such as water, previously subjected to electrostatic fields. When subjected to an initial electrostatic treatment, the fluid undergoes a reduction in surface tension and neutralization of charged, dissolved particles therein. Subsequent field treatments effect nucleation or coagulation of dissolved impurities and break molecule clusters to aid the nucleation or coagulation action. Suspended and nucleated or coagulated matter is removed from the fluid after the electric field treatments by discharging the fluid against an electrically conductive surface at ground potential maintained at a temperature different from that of the fluid. This causes the suspended and nucleated or coagulated matter to be deposited from the fluid and thus readily permits separation and removal.

## 3,788,474
## APPARATUS FOR CONCENTRATING A LIQUID CONTAINING NON-ULTRAFILTRABLE ELEMENTS

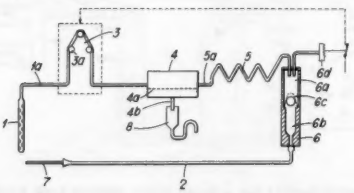
Alain Granger, Lesigny, and Andre Sausse, Sceaux, both of France, assignors to Rhone-Poulenc S.A., Paris, France

Filed Oct. 12, 1971, Ser. No. 188,137

Claims priority, application France, Oct. 12, 1970, 70.36774

Int. Cl. B01d *31/00*

U.S. Cl. 210—137 3 Claims



Apparatus and process for the concentration of a liquid containing non-ultrafiltrable elements, e.g. ascitic fluid in which liquid is fed to an ultrafilter having a membrane therein, and the concentrate and ultrafiltrate are withdrawn from the ultrafilter in which a pressure drop is induced in the concentrate by an auxiliary hydraulic resistance causing a pressure drop in concentrate which is proportional to the pressure drop exerted on the ultrafiltrate by the membrane in the inverse ratio to the ratio of the flow rates of the concentrate and of the ultrafiltrate.

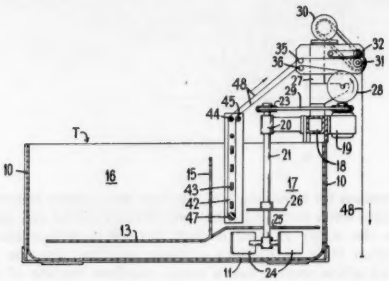
## 3,788,475
## CONTAINER

Joseph C. Gould, and Robert L. Hayes, both of Honea Path, S.C., assignors to The B. F. Goodrich Company, New York, N.Y.

Division of Ser. No. 94,482, Dec. 2, 1970, Pat. No. 3,694,117. This application Apr. 24, 1972, Ser. No. 246,821

Int. Cl. B01d *33/04*

U.S. Cl. 210—167 2 Claims



A tank apparatus used in the making of surgeons' gloves wherein the tank contains interconnected compartments so that there is continuous flow of solutions therethrough. A filter is movably mounted in the tank to strain the solution as it circulates.

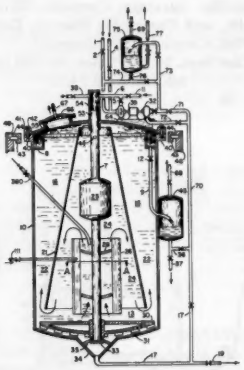
## 3,788,476
## SEWAGE TREATMENT SYSTEM

Donald F. Othmer, 333 Jay St., Brooklyn, N.Y.

Filed Sept. 23, 1971, Ser. No. 182,967

Int. Cl. B01d *21/06, 21/24*

U.S. Cl. 210—194 9 Claims



A system is described for removing pollutants of waste waters, including domestic and other sewage, by simultaneous oxidation of organic wastes, both soluble and insoluble, and by sedimentation of insoluble particles causing turbidity. This is essentially a conventional solids-liquid contactor clarifier with some additions to provide means for: (a) addition of air or purer oxygen to sewage waters; (b) pressurizing the sewage water up to 10 atmospheres to increase solubility and concentration of oxygen-hence velocity of chemical and/or aerobic reaction; (c) withdrawing and depressurizing the sewage

water to atmospheric pressure to allow most of dissolved gases to be released and to be discharged because of lower solubility for gases at atmospheric pressure; (d) recycling the sewage water for from 2 to 50 times through this pressurizing-depressurizing cycle; and, when used aboard ship, (e) means for installation in the ship's hold to minimize effects of the ship's movements on the sedimentation operation. It is particularly useful for smaller installations, for use on ships, and other places where waste from not more than several thousand people is to be handled. It also may be used as a sedimentation system alone wherein insoluble solids are settled out to give a clear effluent. The sludge solids produced in an earlier sedimentation, either with or without oxidation, may be oxidized and sedimented in a separate step in the equipment.

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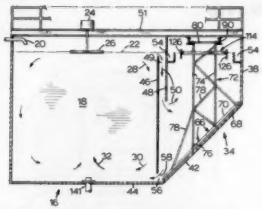
**3,788,477**

**TREATMENT APPARATUS**

**Leonard Sidney Love, 1457 Glen Rutley Cir., Mississauga, Ontario, Canada**

**Filed July 19, 1971, Ser. No. 163,907**
**Int. Cl. B01d** *21/04, 21/18*
**U.S. Cl. 210—195** **5 Claims**



Treatment apparatus for aerating or mixing, and clarifying, liquids such as industrial and sanitary waste waters and for conducting chemical reactions, in which an aeration or mixing basin and a clarifier are formed as one integral unit, separated by a baffle. Flow from the aeration basin into the clarifier is limited by flow control plates. The clarifier has a bottom which slopes toward the aeration basin bottom, so that solids settling in the clarifier flow down the clarifier bottom towards the aeration basin, where they are picked up by circulation in the aeration basin and re-suspended. A sludge scraper scrapes the clarifier bottom periodically to dislodge sludge adhering to the bottom, and a scum skimmer skims the clarifier surface periodically to remove scum.

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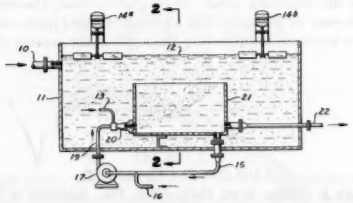
**3,788,478**

**WASTE WATER TREATMENT**

**William E. Savage, Castro Valley, Calif., assignor to Shell Oil Company, New York, N.Y.**

**Filed Aug. 19, 1971, Ser. No. 173,058**
**Int. Cl. B01d** *21/00*; **B03d** *1/00*
**U.S. Cl. 210—197** **1 Claim**



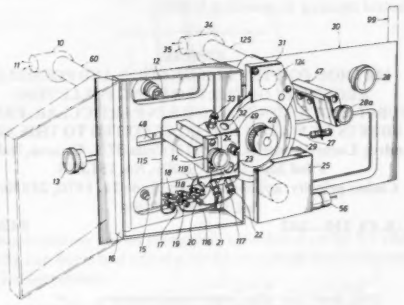
Waste water treating process wherein aeration and separation of bacterial matter to form a clarified effluent is accomplished in a single treating zone employing a submerged flotation cell.

**3,788,479**

**DISC CONVEYOR FLAME IONIZATION DETECTORS**

**Julius J. Szakasits, Deer Park, Tex., assignor to Shell Oil Company, Houston, Tex.**

**Filed Apr. 13, 1972, Ser. No. 243,729**
**Int. Cl. B01d** *15/08*
**U.S. Cl. 210—198 C** **8 Claims**



Effluent to be tested is deposited on a porous alumina disc, the disc being rotated into a heater where the eluent is vaporized leaving a residue (the sample) whereupon the sample is then transported by the conveyor into a dual jet flame ionization detector (FID). After passing through the FID the disc then passes through an oxidizer where any remaining residue from the disc are removed by oxidation whereupon the disc then passes through a cooler, cooling the disc prior to the disc returning to a point where more effluent will be deposited for further analysis.

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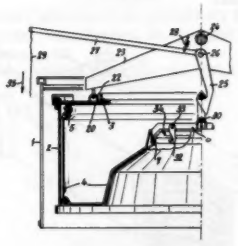
**3,788,480**

**SECURING DEVICE FOR A REMOVABLE BAG FOR A CENTRIFUGE**

**Joseph Rousselet, Annonay, France, assignor to Etablissements Rousselet, Montalinet, Annonay, Ardeche, France**

**Filed Aug. 27, 1971, Ser. No. 175,551**
**Claims priority, application France, Sept. 3, 1970, 70.32813**
**Int. Cl. B01d** *21/26*
**U.S. Cl. 210—237** **5 Claims**



A securing device for a removable bag for a centrifuge having a vertical axis for its basket provided with a central cone, the bag comprising an outer cylindrical part to fit the outside wall of the basket, an intermediate part to fit the bottom of the basket, and a truncated conical part to fit the central cone and provided with a central opening. The securing device is constituted by a circular skirt to fit inside the perimeter of the basket, the skirt being connected to the upper edge of the cylindrical part of the bag, a crown to which the skirt is fixed, and a cruciform member connected to the edge of the central

opening of the bag. A lifting assembly adapted to be suspended from a hoist can be detachably connected to the crown, the lifting assembly also being detachably engageable with the cruciform member. The device may either be supported on feet at a discharge station, with a central sliding rod of the lifting assembly then permitting the central opening of the bag to fall, or a manually operated lever may be provided on the lifting assembly to effect release of the central opening to permit it to fall.

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**3,788,481**

**METHOD FOR THE ELIMINATION AND POSSIBLE RECOVERY OF THE FLOATING POLLUTING SUBSTANCES, MINERAL OILS IN PARTICULAR, FROM SHEETS OF WATER AND BOAT FITTED TO THIS AIM**

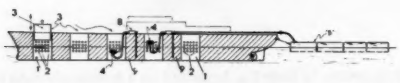
**Andrea Lucio deAngelis, via F. 11i Coda 37/1, Genova, Italy**

**Filed June 10, 1971, Ser. No. 151,878**

**Claims priority, application Italy, June 11, 1970, 25830/70**

**Int. Cl. E02b** *15/04*

**U.S. Cl. 210—242** **5 Claims**



Method for the elimination and/or the recovery of floating polluting substances from liquid surfaces a, and boat for carrying out the method according to which:

the polluted liquid surface is successively, fully or in part, withdrawn from the action of the wind and, at least in part, from the natural wave motion, and segregated;

the segregated floating polluting substance is skimmed together with a minimum quantity of the underlying water;

the liquid skimmed is collected and decanted while the floating substance is separated.

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**3,788,482**

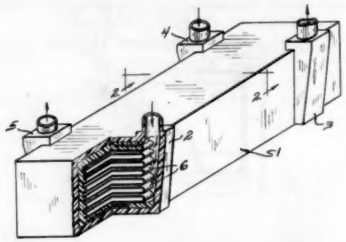
**FOLDED MEMBRANE DIALYZER**

**Finley W. Markley, Naperville, Ill., assignor to The United States of America as represented by the United States Atomic Energy Commission, Washington, D.C.**

**Filed Mar. 10, 1972, Ser. No. 233,528**

**Int. Cl. B01d** *31/00*

**U.S. Cl. 210—321** **13 Claims**



The present invention relates to an apparatus for the dialysis of two fluids and the method of making the same and is directed particularly to an apparatus for the dialysis of blood. The present invention uses a semipermeable membrane in sheet form, the membrane being folded into a large number of very closely spaced pleats. Support members are contained in all the pleats on one side of the membrane, all of the edges of which are sealingly embedded in a plastic material constituting at least a portion of the housing to give separate fluid chambers on the two sides of the membrane. A first fluid passes through the first such chamber within the pleats in a direction generally parallel to the creases of the pleats while a second fluid flows through the second chamber on the opposite side of the membrane pleats in a direction countercurrent to the first fluid. The apparatus is constructed either by placing the assembled folded membrane in a preconstructed rectangular casing and injecting a plastic material so as to surround and embed the edges of the membrane in the plastic material, or by placing the assembled folded membrane in a mold to form the housing by injecting a plastic material into the mold so as to surround and embed the edges of the membrane in the plastic material.

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**3,788,483**

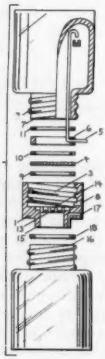
**APPARATUS FOR FILTRATION**

**Walter D. Conway, 52 MacArthurville Drive, Williamsville, N.Y.**

**Filed May 26, 1972, Ser. No. 257,248**

**Int. Cl. B01d** *29/00*

**U.S. Cl. 210—416** **6 Claims**



The invention describes a device especially suited for laboratory scale filtration comprising a sample container, a filter element attached to the sample container by means of a threaded cap terminating in a funnel-shaped means which conveys the filtrate to a receiving vessel. Various embodiments of the invention allow the filtration to be accomplished either by centrifugal means, application of pressure to the atmosphere in the sample vessel, evacuation of the atmosphere within the receiving vessel, or by gravity flow. The entire assembly may be placed within a tubular-shaped heater to maintain an elevated temperature throughout the course of filtration.

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**3,788,484**

**INLINE FLUID FILTER**

**Thomas J. Godin, West Hollywood, Fla., assignor to Coulter Electronics Inc., Hialeah, Fla.**

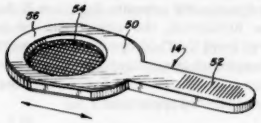
**Filed Aug. 23, 1971, Ser. No. 173,846**

**Int. Cl. B01d** *27/08*

**U.S. Cl. 210—447** **6 Claims**

A fluid filter to be used for inline installation or in systems which are not to be disturbed when it is desired to clean or

replace the filter member. An enclosed body has a lateral slot and the filter element is carried by a removable carrier




member which is engaged in the slot into filtering position. Seals are provided to prevent leakage when the carrier member is in operative position.

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**3,788,485**

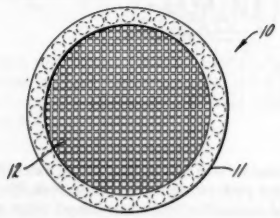
**DRAIN GUARD FOR CONTACT LENS**

**Leslie Bruning, San Polo 2962, Venice, Italy**

**Filed July 20, 1972, Ser. No. 273,352**

**Int. Cl. E03c** *1/26*

**U.S. Cl. 210—474** **4 Claims**




A flexible contact lens drain guard having a ring fabricated of rubber or plastic or the like. A mesh net extends across the ring opening and is bonded to or formed unitarily with the ring. Suction means are formed on the base of the ring and extend around its circumference.

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**3,788,486**

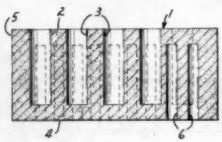
**FILTER**

**Theodore R. Bergstrom, Little Canada, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Filed Sept. 30, 1971, Ser. No. 185,270**

**Int. Cl. B01d** *27/02*

**U.S. Cl. 210—496** **7 Claims**




A rigid filter, useful for example for filtering molten thermoplastic resin as it is forced through a spinnerette head, comprising a rigid block of shaped uniformly permeable material, having continuity and identity of composition and having increased filtering capacity, with a plurality of filtration cavities extending into the block from the top surface and a plurality of drainage cavities extending into the block from the bottom surface.

**3,788,487**

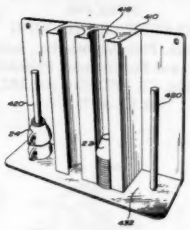
**CONTAINER WITH CUP LINERS AND CUP HOLDERS**

**Theodore R. Dawson, 3794 Blossom Ln., Odessa, Tex.**

**Filed Oct. 21, 1971, Ser. No. 191,330**

**Int. Cl. A47f** *7/28*; **B42f** *13/12*

**U.S. Cl. 211—49 D** **10 Claims**



This container has an elongated, cylindrical cavity for positioning cup liners and either a cavity or a pintle for positioning cup holders neatly.

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**3,788,488**

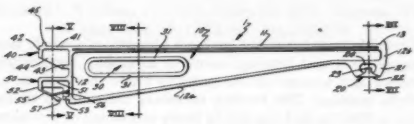
**SLACK, TIE AND COAT HANGER**

**Judd F. Garrison, and John H. Batts, both of Grand Rapids, Mich., assignors to John Thomas Batts, Inc., Zeeland, Mich.**

**Filed Mar. 27, 1972, Ser. No. 238,182**

**Int. Cl. A47f** *5/00*; **E06b** *7/28*

**U.S. Cl. 211—123** **21 Claims**



A clothing display bar having an elongated trouser-supporting body with a tie supporting aperture therethrough, a hook at one end thereof and a pair of vertically adjacent mounting heads at the other end thereof for mating insertion into a pair of mounting brackets.

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**3,788,489**

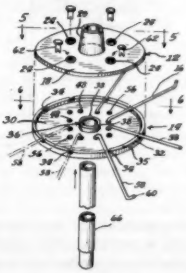
**SUPPORT MEANS FOR A DISPLAY STAND**

**Leon M. Lerinthal, Lincolnwood, Ill., assignor to RTC Industries Inc., Chicago, Ill.**

**Filed Mar. 8, 1972, Ser. No. 232,760**

**Int. Cl. A47f** *5/02*

**U.S. Cl. 211—163** **1 Claim**



Support means for use in connection with an upright on a display stand, said support means comprising a pair of plastic

molded plate members each having a hub portion which engages the tubular upright on which the support means is positioned. Said plate members are adapted to support therebetween a plurality of radially extending arms on which objects to be displayed are hung and/or supported.

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**3,788,490**

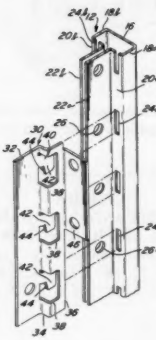
**ERECTIBLE SHELVING**

**Daniel J. Featherman, Philadelphia, Pa., assignor to Featherman, Featherman and Featherman, Philadelphia, Pa.**

**Filed Aug. 22, 1972, Ser. No. 282,681**

**Int. Cl. A47f** *5/10*

**U.S. Cl. 211—176** **6 Claims**



Erectible metal shelving having a plurality of verticle supporting posts and bracing members extending horizontally between and secured to the posts to brace the posts in an upright position. The bracing members are secured to the posts so that the shelving can be easily assembled or disassembled without the need of any special tools.

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**3,788,491**

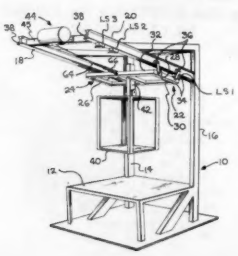
**APPARATUS FOR MOVING AN OBJECT ALONG A PREDETERMINED PATH**

**Charles W. Stone, Garden City, Mich., assignor to D. W. Zimmerman Mfg., Inc., Madison Heights, Mich.**

**Filed May 28, 1971, Ser. No. 147,823**

**Int. Cl. B66c** *17/00*

**U.S. Cl. 212—25** **10 Claims**



Improved drive apparatus for moving an object along a predetermined path is provided. The object to be moved is supported and guided by a member which also establishes the predetermined path with the drive apparatus moving the object between at least two given positions on the path. The drive apparatus constitutes a fluid-operated cylinder and piston combination which is effective to operate a cable drum and correspondingly move a cable which is connected to the object to be driven. The fluid-operated apparatus moves the object along the path toward the apparatus when the cable is under sufficient tension, while other means are provided for moving the object in the opposite direction. If the path is at an angle to the horizontal, the object can be moved in the direction away from the fluid-operated apparatus by gravity; if the path is horizontal or substantially so, a fluid-operated tensioning device can be provided for moving the object away from the fluid-operated apparatus.

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**3,788,492**

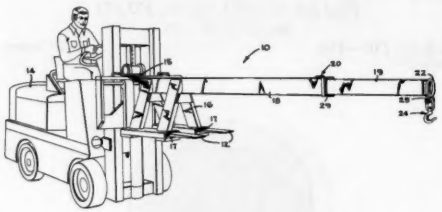
**LATCH MECHANISM FOR EXTENSIBLE BOOM**

**Robert E. Kraft, Naperville, Ill., assignor to FMC Corporation, San Jose, Calif.**

**Filed Jan. 14, 1972, Ser. No. 217,871**

**Int. Cl. B66c** *23/06*

**U.S. Cl. 212—55** **2 Claims**



An automatic latch mechanism for an extensible boom attachment for portable vehicles such as fork lift trucks is disclosed. The extensible boom has a fixed outer section and a sliding inner section telescoping into the outer section. A lever carrying a pin projecting perpendicular to the lever near its lower end is pivoted on the top portion of the outer boom section. The pin on the lever protrudes through a slot in the outer boom section to engage one of a series of similar mating slots in the inner boom section. The pin automatically locks the inner boom to the fixed outer boom section at the selected position by the gravity action of the pivoted lever combined with the eccentric location of the hinge on the lever creating a torsional moment tending to rotate the lever to its fully engaged position.

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**3,788,493**

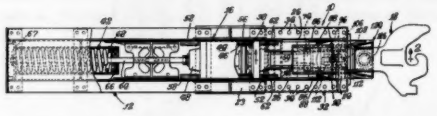
**COUPLER CENTERING DRAFT GEAR**

**Vaughn T. Hawthorne, Mechanicsburg, and Ronald H. Lundstrom, Dillsburg, both of Pa., assignors to Keystone Industries, Inc., Chicago, Ill.**

**Filed Oct. 26, 1971, Ser. No. 192,279**

**Int. Cl. B61g** *7/12*

**U.S. Cl. 213—20** **13 Claims**



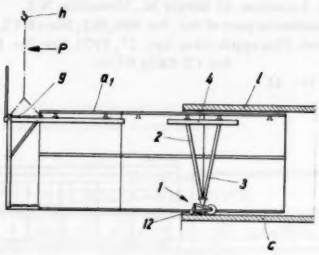
A draft gear for a railway car has an impact absorbing device mounted in a yoke to abut a pivotable coupler and provide coupler centering action, the magnitude of which increases as the draft gear moves toward its buff position. The yoke also has integral bracket portions for a retaining pin which holds in place a coupler pin on which the coupler pivots and a coupler carrier assembly which vertically supports the coupler in the yoke.

3,788,494

## APPARATUS TO FACILITATE THE EXTRACTION OF A ROOM FORM

Wolfgang Markewitz, Hilden, and Fritz Mischke, Dusseldorf, both of Germany, assignors to Fa. Hunnebeck GmbH, Lintorf, Germany

Filed Feb. 22, 1972, Ser. No. 227,835
Claims priority, application Germany, Feb. 25, 1971, 2108815
Int. Cl. B66c 1/10
U.S. Cl. 214—1 H 8 Claims



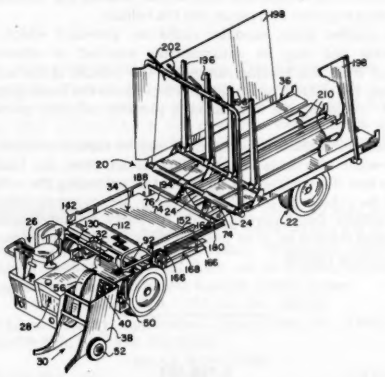

An apparatus to facilitate the extraction of a room form which comprises a frame for carrying said room form, said frame carried on a two-axled dolly and being pivotable with respect to said dolly.

3,788,495

## AUTOMATIC BALE HANDLING DEVICE

Robert M. Fachini; Fenton L. Kenna, Jr.; Monroe C. Barrett; Louis E. Nickla, all of Memphis, Tenn., and Robert L. Graham, Houston, Tex., assignors to International Harvester Company, Chicago, Ill.

Filed July 6, 1971, Ser. No. 159,902
Int. Cl. B65g 57/28, 57/32, 57/22
U.S. Cl. 214—6 B 14 Claims



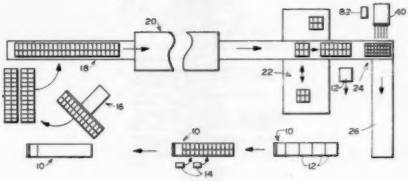

A bale wagon for mechanically accumulating a load of bales arranged in a cross-tied pattern, and including an accumulator table, bale transfer assemblies, and a load carrying bed. The bale transfer assemblies operate to arrange selected layers of bales in distinct patterns to provide a cross-tied stack. The accumulator table is pivotally movable to deposit layers as vertical tiers onto the load carrying bed which, in turn, is pivotally movable to deposit a bale stack onto the ground.

3,788,496

## CAR LOADING APPARATUS

Wells A. Webb, 1788 Shattuck Ave., Berkeley, Calif., and Freling E. Baker, 2290 Stockton St., Apt. 203, San Francisco, Calif.

Filed July 12, 1971, Ser. No. 161,587
Int. Cl. B65g 57/28, 67/04
U.S. Cl. 214—6 C 7 Claims



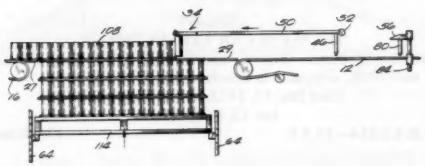

There is disclosed a method and apparatus for assembling and loading cartons into transport vehicles such as trucks and railway cars. The apparatus includes a turning mechanism in combination with a conveyor for orienting a plurality of cartons into unit stacks which are assembled into tiers of stacks having pre-selected dimensions to fit a given cargo space. Mechanical means are then used for inserting the assembled stacks into available cargo space to make a tight fit.

3,788,497

## FLOW-THRU PALLETIZER AND DEPALLETIZER

Kenneth G. Carlson, 11350 N. Valley Dr. 18W, Mequon, Wis.

Filed Sept. 27, 1972, Ser. No. 292,571
Int. Cl. B65g 60/00
U.S. Cl. 214—6 P 8 Claims



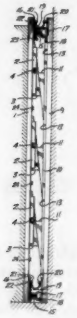

A conveying system including two conveyors for conveying empty cans from a can making machine to a can filling machine includes palletizing and depalletizing apparatus located intermediate the conveyors to palletize cans when desired and depalletize cans to regulate flow between the machines. Empty cans are moved from one conveyor to another in patterned complements by a sweep bar to supply the requirements of the can filling machine. When the can filling machine is not in operation, patterned complements are sequentially deposited in layers on pallets. The pallets are stored on a storage conveyor associated with the pallet loading bin. When cans are required at the can filling machine and the can making machine is not in operation, the cans stored on the pallets are raised in the pallet loading bin with the layers of patterned cans swept from the pallet onto the conveyor for the can filling machine. The sweep bar assembly includes pattern forming dies for initiating a honeycomb pattern of cans flowing toward the sweep bar and a set of can engaging fingers spaced from the pattern forming bar which are operative to engage the rear rank of cans of the patterned can complement to maintain the cans in the pattern as the can complement is moved horizontally onto a retractable apron over the pallet loading bin.

**3,788,498**

## SELF-TIGHTENING DUNNAGE

**Leonard G. Slusher, Seattle, Wash., assignor to Burlington Northern, Inc., St. Paul, Minn.**

**Filed May 2, 1972, Ser. No. 249,518**
**Int. Cl. B65g 1/14**
**U.S. Cl. 214—10.5 R** **10 Claims**



Compression springs engaged between the upper and lower ends of brace slats urge the slats apart and they are held in spaced relationship by pairs of interengageable wedges, each pair having a normally fixed wedge and a normally slidable wedge. Ties adjacent to the springs hold the slats in contracted relationship against the spring pressure until released for expansion of the dunnage. Tightening is effected by automatic downward sliding of the slidable wedges relative to the normally fixed wedges. The normally fixed wedges can be released for freeing the slidable wedges to retract such wedges for contraction of the dunnage from load-clamping condition and subsequent dunnage removal.

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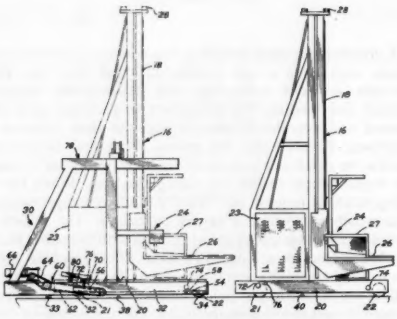
**3,788,499**

## TRANSFER CAR ARRANGEMENT

**William E. Burns, Ottawa, and Robin Taylor, Park Forest, both of Ill., assignors to Interlake Inc., Chicago, Ill.**

**Filed Jan. 17, 1972, Ser. No. 218,405**
**Int. Cl. B65g 1/06**
**U.S. Cl. 214—16.4 B** **13 Claims**



In a transfer car arrangement, particularly for the use in a storage and retrieval system, a load carrier which is movable longitudinally in the aisles between storage frames is positionable upon a transfer car for transfer between the aisles. Both the load carrier and the transfer car are floor running upon a coplanar floor surface and the load carrier includes rollers which cooperatively engage inclined ramps on the transfer car and which support the load carrier during transfer and the load carrier is supportably positioned upon the transfer car by powered lugs which engage the load carrier such that the load carrier wheels are spaced above the floor surface when the load carrier is being transferred.

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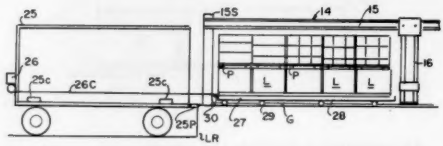
**3,788,500**

## AUTOMATIC TRANSFER AND TRANSPORT SYSTEM

**Jerome H. Lemelson, 85 Rector St., Metuchen, N.J.**

**Continuation-in-part of Ser. No. 806,501, March 12, 1969, abandoned. This application Apr. 27, 1971, Ser. No. 137,992**
**Int. Cl. B65g 67/04**
**U.S. Cl. 214—41** **5 Claims**



An apparatus and system for automatically loading and unloading vehicles such as truck and trailer bodies, cargo aircraft, trains, boats and the like utilizing computer-controlled stacker cranes and specialized guidance means therefore to effect the direct or indirect transfer of palletized cargo to and from a loading ramp or ramp system and one or more vehicles which are prepositioned relative thereto.

In one form, a track system such as an overhead monorail trackway for guiding stacker cranes is provided to carry loads from temporary storage in racking located near or at a loading ramp to vehicles predeterminately disposed with respect to said ramp. Upon predeterminately aligning a vehicle with the ramp and crane trackway, one or more stacker cranes may be operated to automatically load and/or unload the vehicle by traveling adjacent thereto or into the vehicle.

In another form, modular racks are provided which are portable and may be automatically winched or otherwise moved from the loading ramp into the vehicle in the act of loading the vehicle or from the vehicle onto the loading ramp when unloading the vehicle of a plurality of such portable racks.

Either the vehicle or a trackway may be moved to effect the movement of a materials handling device from the loading ramp into the vehicle and, in the act of unloading the vehicle from the vehicle onto the loading ramp. Means are provided in the vehicle for retaining loads or racks predeterminately disposed therein so as to prevent their shifting during movement of the vehicle.

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**3,788,501**

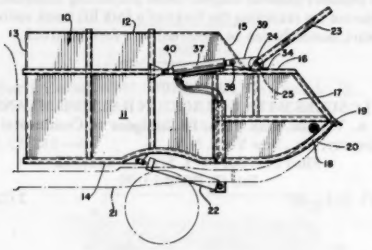
## ADJUSTABLE MOUNTING FOR REFUSE DUMP TRUCK PACKER PLATE

**Douglas C. Steltz, Waukesha, Wis., assignor to Portec, Inc., Oak Brook, Ill.**

**Filed Oct. 28, 1971, Ser. No. 193,334**
**Int. Cl. B65f 3/00**
**U.S. Cl. 214—83.3** **7 Claims**

The packer door or plate of a refuse collection and dump truck is supported for swinging movement on a pair of pillow

blocks which are mounted adjustably on side ledges of the truck body. The pillow blocks are adjusted and locked in position to provide a precise clearance between the packer plate and the rear mouth of the dump body.



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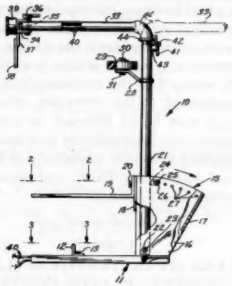
**3,788,502**
**BOAT GUIDE DEVICE**
**Larry E. Bell, 6040 McMahon Dr., Sacramento, Calif.**
**Filed Jan. 17, 1973, Ser. No. 324,487**
**Int. Cl. B60p** *3/10*
**U.S. Cl. 214—84** **5 Claims**



A device for boats and trailers consisting primarily of a mounting channel and mounting bar secured to a base member carrying a pipe with a pivotable end having a tail and stop light secured to it, the pipe also having a protective rubber wheel and a locking handle for the upper pipe member.

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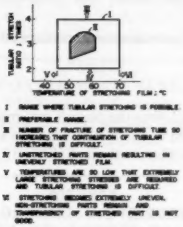
**3,788,503**
**METHOD FOR PRODUCING BIAXIALLY MOLECULE-ORIENTED POLY-ε-CAPROAMIDE RESIN FILM**
**Hidenori Hirose; Masaaki Tsubosaki; Masayoshi Sugiyama; Akira Skkita, and Mitsuo Kito, all of Fujishi, Japan, assignors to Kabushiki Kaisha Kohjin, Tokyo, Japan**
**Filed Dec. 10, 1970, Ser. No. 96,741**
**Claims priority, application Japan, Dec. 30, 1969, 44-105459; Feb. 24, 1970, 45-15243**
**Int. Cl. B29c** *17/06*
**U.S. Cl. 264—95** **17 Claims**

A biaxially molecule-oriented film of poly-ε-caproamide resin having an improved dimensional stability and surface slip characteristic is prepared by extruding the molten resin downward through an annular die, quenching and solidifying the extruded film by means of an internally liquid-cooled, cooling mandrel having a specific shape to form a substantially amorphous, non-stretched tubular film substantially free of any hydrogen bond, allowing the thus obtained film to come in contact with a heating gas while heating the film at a temperature of from 45° to 70°C and keeping a water content of the film at not more than 2 % based on the weight of the film, biaxially stretching the heated film simultaneously at a stretching ratio of 2 to 4 in both longitudinal and transversal directions by introducing a pressurized gas into the tubular film between a low speed feeding section and a high speed take-up section of the film, and heat-setting the thus stretched film while keeping a water content of the film at least at 1 % based on the weight of the film to an equilibrium water absorption content in water.



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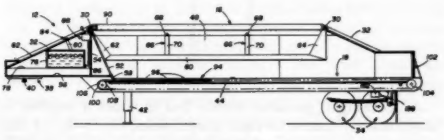
**3,788,504**
**MATERIAL DELIVERY SYSTEM**
**John H. Holland, Norman, Okla., assignor to Arkansas Rockland Gravel Co., Murfreeshow, Ark.**
**Division of Ser. No. 852,345, Aug. 22, 1969, Pat. No. 3,647,096. This application Oct. 6, 1971, Ser. No. 187,185**
**Int. Cl. B60p** *1/38*
**U.S. Cl. 214—52** **2 Claims**



A delivery system for hot asphalt includes a plurality of semi-trailers. Each trailer includes a V-shaped hopper having an asphalt supporting beam extending longitudinally through it. A tube extends around the hopper for use in spraying lubricating oil into the hopper prior to the loading of asphalt. Each trailer further includes a conveyor for unloading asphalt from the hopper into a paving machine. The conveyor is driven by a hydraulic motor that is controlled by a valve. The valve is mounted in the trailer for activation by a prod mounted on the paving machine so that the operation of the conveyor is controlled from the paving machine.

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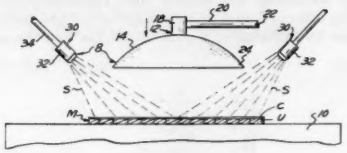
**3,788,505**
**METHOD FOR VACUUM PICK-UP OF POROUS MATERIALS**
**Jerry Kirsch, 36 Beacon Hill, Grosse Pointe Farms, Mich.**
**Division of Ser. No. 181,074, Sept. 16, 1971, Pat. No. 3,710,953. This application Nov. 3, 1972, Ser. No. 303,605**
**Int. Cl. B66c** *1/02*
**U.S. Cl. 214—152** **4 Claims**

Porous materials, such as cloth or unglazed ceramics or porous plastics which on account of their porosity defy ordinary vacuum pick-up, are made temporarily imperforate by applying to them a temporary coating of liquid, such as water, whereupon their porosity is momentarily sufficiently inhibited

to permit their pick-up and transfer by suction, as by a suction cup device. The liquid coating is deposited either by rolling or



spraying the liquid onto the porous material either from above it (FIG. 1) or from beneath it either for a single layer (FIG. 2) or for a plurality of layers thereof (FIG. 3).

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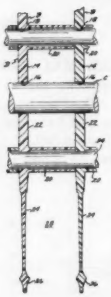
**3,788,506**
**DEVICE FOR RETRIEVING SUBMERGED GOLF BALLS AND ON DRIVING RANGE**
**Delbert R. Lee, 20927 Flapjack Dr., Diamond Bar, Calif.**
**Continuation of Ser. No. 61,683, Aug. 6, 1970. This application Apr. 10, 1972, Ser. No. 242,871**
**Int. Cl. B60p *1/00***
**U.S. Cl. 214—356** **1 Claim**



A lightweight, portable device that includes a number of longitudinally spaced resilient plastic discs, which device may be alternately drawn from one bank of a lake to the opposite bank, and when so drawn retrieve submerged golf balls in the lake as the disc's pressure contacts the ball. After the balls have been retrieved by the device, and the device positioned on dry land, the balls are removed from between the discs by laterally deforming the peripheral edge portions of the latter.

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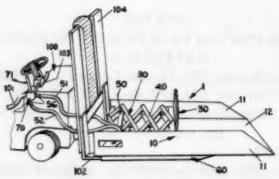
**3,788,507**
**MATERIALS HANDLING SCOOP**
**Herman Voss, 155 Vista Ter., Muskegon, Mich.**
**Filed Aug. 25, 1971, Ser. No. 174,867**
**Int. Cl. B66f *9/19***
**U.S. Cl. 214—620** **5 Claims**



This materials handling apparatus includes a scoop, having a push plate slidably mounted therein. Lazy tongs connected to the back of the scoop and to the push plate are extended and retracted by a hydraulic cylinder which can be operably connected to the hydraulic system of a fork lift truck. The scoop includes channel shaped shoes projecting from the bottom thereof for receiving the forks of a fork lift truck such that the entire assembly can be mounted on a fork lift truck.

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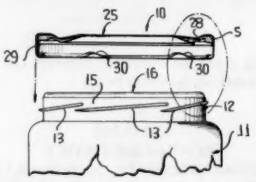
**3,788,508**
**CLOSURES WITH CORROSION HALTING MEANS**
**Peter A. Vercillo, Oak Park, Ill., assignor to Continental Can Company, Inc., New York, N.Y.**
**Filed Dec. 30, 1971, Ser. No. 213,912**
**Int. Cl. B65d *23/00***
**U.S. Cl. 215—40** **2 Claims**



This disclosure relates to closures including means for halting corrosion, and more particularly to a closure which includes an end panel having a recessed radius which is disposed radially outboard of an inner surface of a container mouth with sealing compound between the radius and a lip of the container whereby the radius which is conventionally positioned radially inboard of the container mouth inner surface and is thus subjected to the corrosive effects of packaged products cannot now be so effected. In further accordance with this disclosure the container lip is at least in part defined by a radius opening generally concavely axially outwardly in opposed spaced relationship to the end panel radius, and the radii are complementary contoured.

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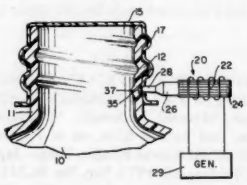
**3,788,509**
**METHOD AND APPARATUS FOR SEALING PLASTIC CLOSURES TO PLASTIC CONTAINERS**
**Frederick D. Keeler, Trumbull, Conn., assignor to The K.L.M. Company, Stratford, Conn.**
**Filed Jan. 28, 1972, Ser. No. 221,633**
**Int. Cl. B65d *41/20***
**U.S. Cl. 215—42** **8 Claims**




A method and apparatus for sealing a plastic closure to a plastic container in which a tool is inserted through a portion, or portions, of the closure wall into the container wall after the closure has been fastened to the container. The tool produces energy of a type to distort the side wall of the closure and the corresponding portion of the container wall to form a projection on the closure and a mating depression on the container to provide a mechanical seal. In a preferred embodiment of the invention, ultrasonic energy is used to distort the necessa-

ry portions of the closure and container to form the mechanical seal and, in some cases, an ultrasonic workpiece produces heat at the interface between the closure and container to provide a weld.

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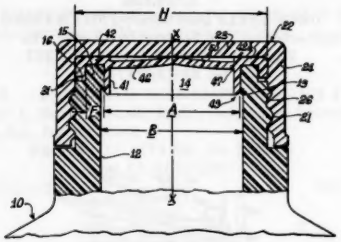
**3,788,510**
**CONTAINER CLOSURE**
**Arthur J. Collins, 6700 N. Edgebrook Ter., Skokie, Ill.**
**Filed Dec. 15, 1972, Ser. No. 315,592**
**Int. Cl. B65d** *53/04*
**U.S. Cl. 215—40** **4 Claims**



A closure of the type comprising an insert assembled with a cap, usually a screw-on cap, for effecting a reliable, leakproof seal between the closure and the pouring neck of a container. Included are means for rapid assembly of the parts into a commercial device ready for application to the container neck. The insert is constructed to deform when the cap is screwed down on the neck to conform the parts of the insert into leakproof relation with the neck.

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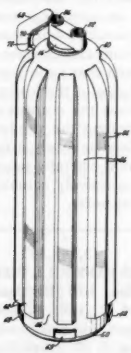
**3,788,511**
**PROTECTIVE JACKET AND BASE FOR PRESSURE VESSEL**
**Robert E. Marsh, 5521 Willow View Rd., Rasine, Wis.**
**Filed Aug. 16, 1971, Ser. No. 172,110**
**Int. Cl. B65d** *25/18*
**U.S. Cl. 220—9 R** **16 Claims**



A pressure vessel, particularly of the type used in water softening service is encased in a light weight protective jacket preferably molded in one piece from a resilient plastic material. In cross section the jacket is of undulant configuration comprising longitudinally extending grooves and ridges with the inner surfaces of the groove portions in surface engagement with the outer surface of the tank and the inner surfaces of the ridge portions spaced from the surface of the tank, the jacket being capable of expansion and contraction in a radial direction in bellows or accordian fashion. The jacket fits over the tank from the top and at the bottom is provided with a tank supporting base that interlocks with the jacket to retain the tank within the jacket. At its opposite ends the jacket is provided with hand grip recesses to facilitate handling of the jacketed tank. Externally the jacket resembles a fluted column.

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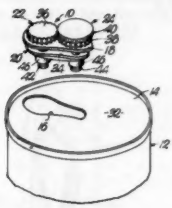
**3,788,512**
**CONTAINER CLOSURE**
**George R. Brahler, 944 Kentucky, Lawrence, Kans.**
**Filed June 2, 1972, Ser. No. 258,958**
**Int. Cl. B65d** *45/00*
**U.S. Cl. 220—25** **8 Claims**



A closure for resealing an opening in a wall of a container, such as the access opening in the top wall of a beverage can, after the original flip top seal has been removed. A resilient, outer member is placed in overlying relationship to the opening and in engagement with the wall about the periphery of the opening, while a resilient, inner member having a size and configuration permitting insertion thereof through the opening and having a concave face normally disposed toward the opening, is placed in an underlying relationship to the opening and the outer member. Upon shifting of the inner member toward the outer member, through the use of a pair of thumbscrews, the inner member engages the wall about the periphery of the opening, and spreads to embrace the opening between the inner and outer members, thereby sealing the same. For removal, the inner member is shifted out of engagement with the wall at which time the inner member resumes its original size and configuration, thus enabling the inner member to be easily removed through the opening.

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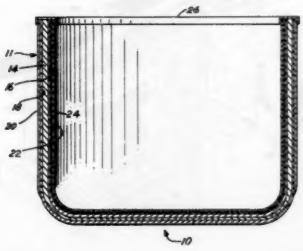
**3,788,513**
**LAMINATED COOKWARE**
**Nick S. Racz, 4800 Chicago Beach Dr., Chicago, Ill.**
**Filed Jan. 15, 1970, Ser. No. 3,044**
**Int. Cl. B02d** *20/14*
**U.S. Cl. 220—64** **17 Claims**



A multiple ply laminated cookware container includes a core ply of high strength and relatively low thermal conduc-

tivity, such as carbon steel, which is sandwiched between non-ferrous plies, such as aluminum. A frit anchor ply may be bonded upon the aluminum ply nearest the interior of the container and a non-stick coating, such as Teflon may be bonded to the frit ply. Preferably, a decorative coating, such as a porcelain enamel, is bonded to the aluminum ply nearest the exterior of the container. The thickness of the steel and non-ferrous plies may be varied so as to suit structural as well as thermal qualities of given areas of the container.

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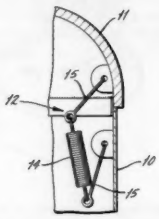
**3,788,514**

**EXPLOSION RELIEF COVER RESTRAINT**

**Frederick Alfred Giacoma, Jr., Crestwood; Channing W. Godbold, St. Louis, and Richard Wilson Stephens, Bridgeton, all of Mo., assignors to Monsanto Company, St. Louis, Mo.**

**Filed Dec. 29, 1969, Ser. No. 888,623**
**Int. Cl. B65d** *51/16, 55/02*
**U.S. Cl. 220—89 A** **9 Claims**




An explosion relief device comprises a displaceable cover of a vessel connected to a fixed base by an extensible restraint. Movement of the cover away from the vessel as a result of the force of an explosion within the vessel distorts the restraint beyond its elastic limit. The distortion of the restraint beyond its elastic limit absorbs the energy of the cover moving away from the vessel, safely stops the cover and does not substantially accelerate the cover's return after it has performed its venting function. The method of restraining the displaceable cover is also disclosed. This device and method are particularly useful with large vessels requiring full diameter venting.

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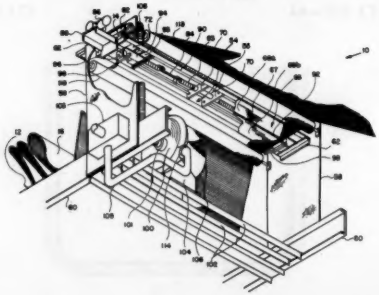
**3,788,515**

**METHOD AND APPARATUS FOR GUIDING AND TENSIONING A WEB**

**David Middleman, Baltimore, Md., assignor to Koppers Company, Inc., Pittsburgh, Pa.**

**Filed Mar. 20, 1972, Ser. No. 236,067**
**Int. Cl. B65h** *23/24*
**U.S. Cl. 226—1** **17 Claims**



A method for guiding an advancing web of single face corrugated paperboard material and applying tension thereto along its path of advance comprising the steps of applying subatmospheric pressure to a smooth side of the web for tensioning the web, and guiding the web along the path of advance. The preferred apparatus for performing the method comprises a motorized suction device connected to a vacuum chamber for applying the subatmospheric pressure to the smooth side of the web for tensioning the web and guide plates for guiding the web during its contact with the vacuum chamber. By applying suction to the smooth side of the web, flute crush is avoided and no noise is generated by the flutes dragging across a stationary object.

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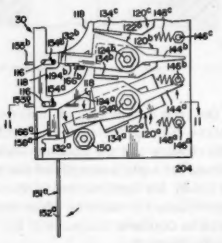
**3,788,516**

**DROP-SHELF DISPENSING MECHANISM**

**Karl Knickerbocker, 400 Baycrest Dr., Venice, Fla.**

**Filed Sept. 25, 1972, Ser. No. 282,277**
**Int. Cl. G07f** *11/06*
**U.S. Cl. 221—90** **13 Claims**



A drop-shelf dispensing mechanism configured for use in a dispensing machine comprising an upper housing including a plurality of pivotally mounted drop-shelves arranged vertically relative to each other for individually supporting products to be dispensed and a corresponding plurality of pivotally mounted actuation/lock-out elements operatively engaging each other and the shelves, a corresponding plurality of support ledges each in communicating relation to a corresponding drop-shelf to hold the drop-shelves in a substantially horizontal position, an actuating means in communicating relation to the actuation/lock-out elements and a lower housing including a dispensing chute means in communication with the upper housing such that upon actuation of the actuating means the retainer ledge of the lower most horizontal drop-shelf is disengaged from the corresponding support ledge to pivot downward dropping the product into the dispensing chute means and simultaneously arming the next adjacent drop-shelf for actuation whereby successive actuation of the actuating means progressively actuates the drop-shelves individually in accending order.

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**3,788,517**

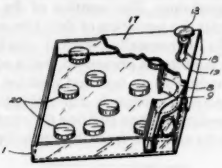
**CHILD-SAFE PILL DISPENSER**

**Joseph M. Eannarino, 610 Highland Ave., Rome, N.Y.; Michael S. Granieri, Jr., 1805 N. James St., Rome, N.Y., and Henry W. Michaelson, 744 Birchwood Ct., Westbury, N.Y.**

**Filed Jan. 3, 1972, Ser. No. 214,712**
**Int. Cl. B65d** *83/04*
**U.S. Cl. 221—154** **1 Claim**

A rectangular pill dispenser container having two compartments where one compartment contains pills and has a opening into a second compartment where a sliding bar with a cavity can accept one pill at a time and where pressing the bar releases the bar so it can be pushed with the pill in the cavity so that the pill is aligned with an opening on the bottom of the bar compartment so that the pill can be paid out. A pill

dispenser of the type described including a resilient bar and a detent that prevents the bar from being moved, unless pressed,



and the feature that allows paying out of one pill at a time making the dispenser child-safe are also enclosed.

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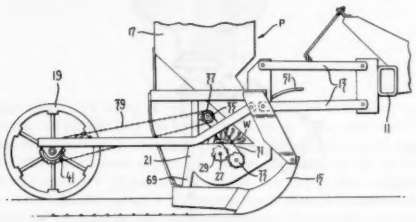
**3,788,518**

**PNEUMATIC SEED DISPENSER**

**Raymond A. Beebe, Detroit, Mich., assignor to Massey-Ferguson, Inc., Detroit, Mich.**

**Filed Jan. 15, 1973, Ser. No. 323,604**
**Int. Cl. A01c** *7/04*
**U.S. Cl. 221—211** **10 Claims**



A seed dispenser has a wheel rotating in a seed housing with the wheel having a plurality of radially extending spoke-like seed selecting tubes connected to a common manifold in turn connected to a pressure source. The connection of the tubes in the passages forms a venturi throat in the passage thus causing a reduction of pressure in the tubes when air is flowing through the passages. Means are provided to selectively and sequentially cut off flow of air out of said passages so that air is forced to flow out of the tubes when the connected tube is at a predetermined circumferential position.

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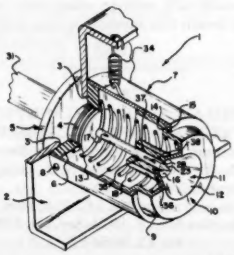
**3,788,519**

**APPARATUS FOR PIERCING A CONTAINER**

**Lloyd A. Mengel, Fairport, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Division of Ser. No. 120,017, March 1, 1971, Pat. No. 3,688,399. This application May 26, 1972, Ser. No. 257,120**
**Int. Cl. B67b** *7/24*
**U.S. Cl. 222—83.5** **2 Claims**



Container-piercing apparatus, wherein an inwardly tapered cup member is provided with an opening into the innermost region thereof for admitting a piercing member. The cup and the piercing member are supported for movement of one relative to the other so that the last-mentioned member can be admitted through the inner opening of the cup in a direction enabling engagement of the piercing member tip with a container received in the cup. Support of the piercing member and the cup for movement along a path transverse to the foregoing direction is provided so that the piercing member tip can be centered with respect to a predetermined location on the container as the container is received in the cup. For conveying fluid from or to a pierced container, the piercing member includes a chamber and a pair of spaced openings which commmunicate with such chamber.

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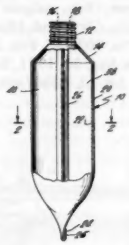
**3,788,520**

**MULTIPLE COMPARTMENT TUBE WITH RESILIENT DIVIDER**

**Joseph Dukess, 931 Greacen Pt., Mamaroneck, N.Y.**

**Filed July 21, 1971, Ser. No. 164,657**
**Int. Cl. B65d** *35/24*
**U.S. Cl. 222—94** **1 Claim**



A squeezeable container in the form of a multiple compartment tube having a resilient bellows divider. One end of the bellows divider is secured to the neck and the other is crimped into the closed opposite end. The bellows have side pieces which lie flush against the inner side walls of the container so that two separate compartments are formed by the divider with the divider being deformable so as to permit variable amounts of material to be deposited in the several compartments.

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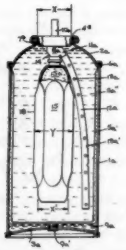
**3,788,521**

**AEROSOL PACKAGE**

**Robert H. Laauwe, 237 Ridge Rd., Franklin Lakes, N.J.**

**Filed July 10, 1972, Ser. No. 270,560**
**Int. Cl. B65d** *35/24*
**U.S. Cl. 222—94** **6 Claims**



An aerosol package includes a rigid container having a dispensing valve and a collapsible flexible container inside of

this rigid container and internally fluid-connected to its valve, the flexible container containing an extrudable liquid product in which a liquified compressed gas is intimately widely dispersed or dissolved. The package features a liquified compressed gas propellant in the rigid container on the outside of the flexible container and having a vapor pressure greater than that of the product's liquified gas as it is dispersed or dissolved in the product. Therefore, when the product is dispensed through the valve, this propellant continuously maintains the product under compression, through its flexible container, to a degree preventing the formation of a vapor phase in the product while the latter is extruding under the pressure of the propellant. The result is that the product's gas remains intimately widely dispersed or dissolved in the liquid product until exposed to the atmosphere, at which time this gas converts to its vapor phase to provide an expanded product that is always of the same density until the product is completely forced from its container.

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**3,788,522**

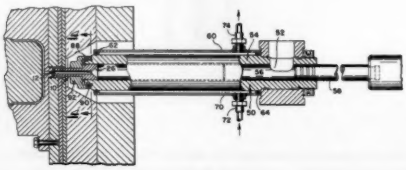
**NOZZLE STRUCTURE FOR INJECTION MOLDING MACHINE**

**James R. Mercer, Akron, Ohio, assignor to McDowell-Welman Engineering Company, Cleveland, Ohio**

**Continuation of Ser. No. 802,785, Feb. 27, 1969, abandoned. This application Aug. 26, 1971, Ser. No. 175,296**

**Int. Cl. B29f** *1/03*

**U.S. Cl. 222—146 R** **8 Claims**



There is provided an improved nozzle structure for an injection molding machine characterized by a generally tubular body having a probe portion, a cylindrical plug portion, and a radial flange adapted for coaction with one end of a tubular heating cylinder of said machine to prevent axial movement thereof into the tubular heating cylinder.

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**3,788,523**

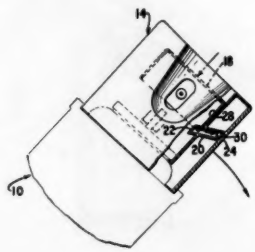
**OVERCAP SAFETY MECHANISM FOR AN AEROSOL CONTAINER**

**Douglas W. Thomas, Toms River, N.J., assignor to American Home Products Corporation, New York, N.Y.**

**Filed Jan. 29, 1973, Ser. No. 327,376**

**Int. Cl. B65d** *83/14*

**U.S. Cl. 222—153** **5 Claims**



A childproof, safety overcap for aerosol containers is disclosed which has a closed end slotted conduit connected to the fixed member so that the movable member must pass through the slot to actuate the valve. A ball is free to roll in the conduit and to move in or out of the slot depending on the position of the container. The position of the ball in the slot permits or prevents the actuation of the valve and discharge of the contents. In a normally vertical discharge position, discharge of the contents is prevented, but is accomplished by rotating the container to an inverted position to roll the ball out of the slot and simultaneously depressing the first movable member into the slot and then righting the container to permit the discharge of the contents from the vertical position.

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**3,788,524**

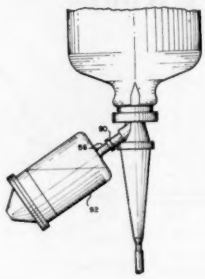
**ADDITIVE CONTAINER**

**Loren Roger Davis, Rancho Cordova, and Walter Dean Kirkland, Walnut Creek, both of Calif., assignors to Cutter Laboratories Inc., Berkeley, Calif.**

**Filed Dec. 22, 1971, Ser. No. 210,848**

**Int. Cl. B65d** *37/00*

**U.S. Cl. 222—209** **15 Claims**



An additive container for supplying an additive material for mixing with a parenteral solution contained in a dispensing receptacle, characterized in that the additive container includes a hollow body member containing therein a chamber that defines at one end an end wall provided with a through opening, said body member including an integral tubular extension that communicates at one end with said opening and at the other end with conduit means having a pointed extremity. The open end of the body member is closed by closure means that are operable to effect flow of fluid through said tubular extension. According to a first embodiment, the closure means comprises a resilient closure member that is manually deformable to effect pumping of fluid through said tubular extension. In a second embodiment, the resilient closure member, in addition to being deformable to effect the aforementioned pumping operation, is also deformable to define a piston element that is longitudinally displaceable within the body member to force additive material through the opening. Finally, in a third embodiment, the closure member comprises the piston element of a syringe which may be adapted for operation by a sheath that normally protects the syringe needle element.

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**3,788,525**

**COMPRESSED AIR ASPIRATING AND PROPELLANT ACTUATED FLUID PRODUCT DISPENSER**

**Marvin L. Thornton, Candlewood Shores, Brookfield, Conn., and Pasquale R. Riccio, Salem, N.H., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

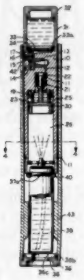
**Continuation-in-part of Ser. No. 252,754, May 12, 1972. This application Mar. 8, 1973, Ser. No. 339,064**

**Int. Cl. B65d** *83/14*

**U.S. Cl. 222—193** **10 Claims**

A compressed air aspirating and propellant actuated dispenser for dispensing fluid products. A valve assembly has a

compressed air flow path therethrough with a valve member obturating the compressed air flow path. A product containing means in the device is connected to the aspirating means by a product flow path. A hollow enclosure surrounds the other end of the compressed air flow path and a piston is movable in the hollow enclosure toward the valve and engagable with the valve member after it has moved into the hollow enclosure for actuating the valve member for opening the compressed air flow path. An aerosol propellant cartridge having a spring loaded dispensing valve is mounted on the device for movement relative thereto for opening said dispensing valve, the



dispensing valve being directed into the hollow enclosure for moving the piston into the hollow enclosure. When the device is moved relative to the cartridge, propellant dispensed into the hollow enclosure drives the piston to compress air in the hollow enclosure ahead of the piston and the piston engages the valve member after it has moved into the enclosure sufficiently far to build up the desired pressure of air within the enclosure in order to open the valve member to allow the compressed air to flow along the compressed air flow path. The propellant is then vented away from the point of product dispensing.

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**3,788,526**

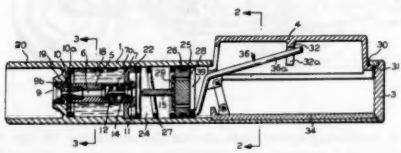
## COMPRESSED AIR OPERATED DISPENSER WITH MECHANICAL FORCE MULTIPLYING MEANS

**Marvin L. Thornton, Brookfield, Conn., and Pasquale R. Riccio, Salem, N.H., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Continuation-in-part of Ser. No. 240,725, April 3, 1972, abandoned. This application Feb. 12, 1973, Ser. No. 331,878**

**Int. Cl. B67d** *5/54*

**U.S. Cl. 222—193** **7 Claims**



A compressed air actuated dispensing device has a valve assembly having a valve body with a compressed air flow path therethrough and a valve member movable in the valve body and obturating the compressed air flow path. Aspirating means is provided at one end of the compressed air flow path and a product containing means in the device feeds product through a product flow path to the aspirating means. A piston-cylinder means is provided around the other end of the compressed air flow path, and a mechanical force multiplying means having an actuating member projecting out of the device is engaged with the piston for compressing air, the piston engaging the valve member for opening the compressed air flow path only after air in the piston-cylinder means has been compressed.

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**3,788,527**

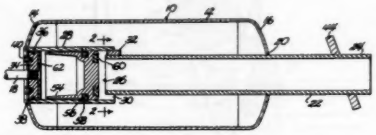
## QUICK-RELEASE AERATOR FOR INTRODUCING HIGH PRESSURE AIR INTO A CONTAINER TO FACILITATE DISPENSING

**Carl G. Matson, Kawanee, Ill., assignor to Martin Engineering Company, Neponset, Ill.**

**Filed Jan. 22, 1973, Ser. No. 325,519**

**Int. Cl. B65g** *3/12*

**U.S. Cl. 222—195** **10 Claims**



A container chargeable with a relatively large volume of air under significant pressure and including quick-release valve means for rapidly discharging the container via a self-contained tubular outlet for suddenly releasing energy into a receptacle for the purpose of accelerating the flow of granular and like materials.

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**3,788,528**

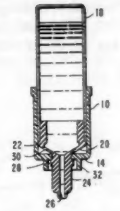
## MINI DROPPER

**Robert W. Ogle, Newport Beach, Calif., assignor to IMS Limited, Wilmington, Del.**

**Filed Aug. 23, 1971, Ser. No. 173,783**

**Int. Cl. B65d** *37/00, 47/18*

**U.S. Cl. 222—209** **7 Claims**



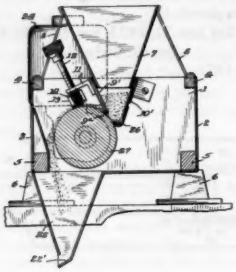
A device adapted to dispense reagents comprising an outer tubular member having an open end and a second end comprising an end wall having therein a concentric circular opening, a vial received in the open end of said tubular member having a resilient stopper sealing its open end, said stopper having an annular shoulder thereon to prevent reciprocation of said stopper in said vial, said stopper also having a projection thereon which is concentric with the stopper, a fluid passage through said stopper and projection, said projection extending through said concentric circular opening and beyond said end wall of the tubular member, said projection having an externally raised ring which forms a snap-fit on the exterior of the concentric circular opening to restrain the projection against longitudinal movement within the opening, said stopper also having an internally hollow convex dome-like configuration in proximity to the inner end of said projection and extending beyond the end of said vial which is adapted to be compressed when said vial is fully advanced within said tubular member to expel a drop of fluid from said vial through said fluid passage.

3,788,529

## MACHINE FOR DISPENSING AND DISTRIBUTING DRY FLOWABLE MATERIALS

Daniel Lamar Christy, 118 Birchard Ave., Fremont, Ohio

Division of Ser. No. 641,725, April 26, 1967, Pat. No. 3,637,112. This application July 14, 1971, Ser. No. 162,337
Int. Cl. G01f 13/00
U.S. Cl. 222—314 8 Claims



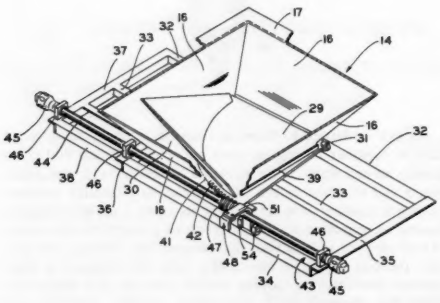
A machine for dispensing comminuted, granular, powdered, flaked, or otherwise divided dry flowable edible or non-edible materials onto the upper surfaces of edible or non-edible articles or products, with an adjustable material discharge flow, onto a rotatable roll which, in turn, carries the material thereover and discharges such material downwardly onto and over the articles or products therebelow in a substantially evenly disseminated and uniform manner.

3,788,530

## GRAVITY DISCHARGE ARRANGEMENT FOR HOPPERS

Franklin P. Adler, Michigan City, Ind., assignor to Pullman Transport Leasing Company, Chicago, Ill.

Filed Dec. 17, 1971, Ser. No. 209,251
Int. Cl. B61d 7/18
U.S. Cl. 222—508 13 Claims



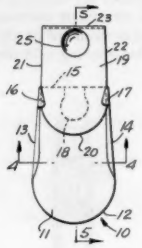
A gravity gate attached to the discharge end of a hopper includes a frame including converging walls sloping toward a discharge opening The gate consists of a sector shaped plate having an arcuate edge provided with a plurality of gear teeth which are driven by means of a spiral gear rotatable about a horizontal axis. One end of the sector shaped plate is pivotally connected to the frame for pivotal movement about a vertical axis.

3,788,531

## COLLAPSIBLE SHOEHORN

Clarence E. Oldfield, 1726 Colorado St., Manhattan, Kans.

Filed Jan. 31, 1973, Ser. No. 328,275
Int. Cl. A47j 51/03
U.S. Cl. 223—118 1 Claim



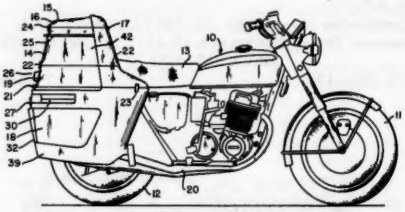
A collapsible shoehorn sometimes called a slipper spoon has a transversely curved lower portion having upturned side edges and a pair of ears bent inwardly at the upper edge thereof. A second arcuate portion is longitudinally slidably positioned under the ears and has tapering side edges so as to wedge against the ears as the second portion is withdrawn from the lower portion to lengthen the shoehorn. The lower portion has a detent socket formed therein and the upper portion has a detent dome which cooperates with the detent socket to releaseably secure the upper portion in collapsed position within the lower portion. A handle flange extends perpendicularly of the upper edge of the upper portion for moving the upper portion in and out of collapsed position within the lower portion and for handling the shoehorn in use.

3,788,532

## SADDLEBAG-TRAVEL CASE FOR A MOTORCYCLE

Raymond C. Bish, 1502 Oliver Bldg., Brockway, Pa.

Filed June 22, 1972, Ser. No. 265,299
Int. Cl. B62j 9/00
U.S. Cl. 224—31 9 Claims



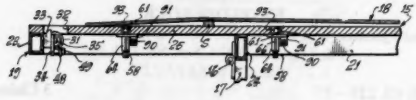
A saddlebag-travel case device for mounting on the rear portion of a motorcycle, comprising a unitary, lower baggage container unit which is adapted to be fixedly attached to the frame of the motorcycle, said lower container unit surrounding the sides and rear of the motorcycle in wrap-around fashion. The rear of the lower container unit may be provided with tail lights and other traffic safety equipment. A unitary upper container unit is provided and it is detachably secured to the top of the lower container unit. The upper and lower container units are provided with latching and locking means and may be independently opened or locked when the upper container unit is in place or when said upper container has been detached.

3,788,533

## INDUSTRIAL PLATE GLASS CUTTER'S TABLE

Byron W. Allen, 188 South I Street, San Bernardino, Calif.

Filed June 9, 1972, Ser. No. 261,388
Int. Cl. C03b 33/02
U.S. Cl. 225—96.5 7 Claims



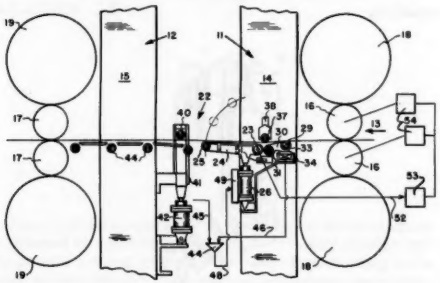
A flat 9 feet by 12 feet carpeted table having a series of retractable rollers along one edge and a field of pins concurrently extensible above or retractable flush with the carpeted face of the table, said table being tiltable between a position steeply inclined towards said rollers to receive on said table a sheet of plate glass resting edgewise on said rollers, and a horizontal table position in which said sheet is supported alternatively on said carpeted surface and on the extended pins to facilitate the manual scoring and then cracking of said plate along a line selectable from a wide variety of options. The retractability of said rollers beneath said carpeted face facilitates removing from the horizontal table the pieces into which said sheet is divided. Removal of the remnant of the sheet is facilitated by re-extending said rollers, shifting said remnant into edgewise contact with said rollers, tilting said table to maximum tilt and rolling said remnant over said rollers to a truck or to storage. The pins are provided optionally with freely rolling ball tips which facilitate horizontally shifting a glass piece while it is supported on said pins without scratching the same.

3,788,534

## METHOD AND APPARATUS FOR TENSIONING STRIP

Charles Storer Shumaker, Glenshaw, Pa., assignor to Wean United, Inc., Pittsburgh, Pa.

Filed Nov. 1, 1972, Ser. No. 302,687
Claims priority, application Great Britain, Jan. 21, 1972, 2,934/72
Int. Cl. B65h 23/22
U.S. Cl. 226—4 5 Claims



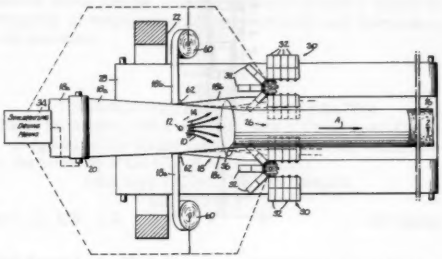
The disclosure of the present invention relates to a method and apparatus for controlling tension in a moving strip passing between two rolling mill stands. A piston cylinder assembly to which a strip-engaging roller is attached is employed to urge the strip away from a straight path of travel. On one side of the cylinder assembly roller a second roller is arranged to contact the strip and with which there is associated a load measuring device for measuring the tension in the passing strip. A signal representing the measured tension in the strip is compared with a signal representing a desired tension by a control that varies the operation of the piston cylinder assembly to reduce any difference between the two signals to a desired value, for example, a zero value.

3,788,535

## WEB TRANSFER SYSTEM

Charles Ferstenberg, Paramus, N.J., assignor to Tenneco Chemicals, Inc., New York, N.Y.

Division of Ser. No. 191,054, Oct. 30, 1971, Pat. No. 3,726,623, which is a division of Ser. No. 54,048, June 1, 1970, Pat. No. 3,659,981, which is a division of Ser. No. 696,079, Jan. 5, 1968, abandoned. This application Nov. 6, 1972, Ser. No. 303,866
Int. Cl. B65h 23/34
U.S. Cl. 226—88 4 Claims



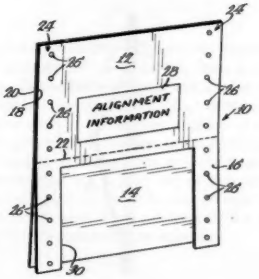
Contouring of flexible webs to the interior of an elongated moving molding channel by the provision of specially located and specially shaped guiding devices, by the provision of special internal mold supports and by the selective overlapping of separate web sheets.

3,788,536

## CONTINUOUS FORMS LEADER

William J. Brown, Palatine, Ill., assignor to Chemplex Company, Rolling Meadows, Ill.

Filed Mar. 30, 1973, Ser. No. 346,355
Int. Cl. B65h 5/28
U.S. Cl. 226—91 3 Claims




A leader for use in the printing of continuous business forms assemblies for enabling alignment of the endmost form in the assembly with a printer without requiring the destruction of such form. A Y-shaped member formed of flexible material is employed, the legs of the member receiving the endmost form of a continuous forms assembly for holding the same enabling the base to be properly aligned with the printer and then fed through the printer after alignment has been achieved carry-

ing the continuous forms assembly through the printer. One of the legs of the Y-shaped member includes an enlarged cut out exposing the face of the form length held by the legs for printing by the printer.

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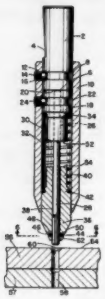
**3,788,537**
**HAND-LOADED PIN CHUCK**
**William P. Fox, c/o Mechanical Application Inc., Edgecomb, Maine**
**Filed July 31, 1972, Ser. No. 276,845**
**Int. Cl. B25c** *1/00*
**U.S. Cl. 227—142** **7 Claims**



A pin chuck comprising a spring pin holder and punch for inserting the spring pin in a cooperating hole in a workpiece. The construction of the tool permits ready substitution of different sized pin holders and punches whereby a range of pin sizes may be inserted through the use of the same basic tool. The tool includes means for accurately controlling the extent of the pin insertion into the hole.

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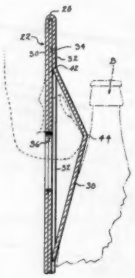
**3,788,538**
**BEER CARTON**
**William A. Kuenzi, Wauwatosa, Wis., assignor to Miller Brewing Company, Milwaukee, Wis.**
**Filed Mar. 23, 1972, Ser. No. 237,408**
**Int. Cl. B65d** *5/32, 5/46*
**U.S. Cl. 229—23 R** **4 Claims**



The entry of light into the interior of a beer carton through the handholes thereof is prevented by flaps, one of which is hingedly attached to the inner surface of each end panel above the upper margin of the handhole. The flaps are preferably wider than the handholes, extend downwardly below the lower margin of the handholes, and have a free lower edge. The flaps are preferably deflectable inwardly along a fold line opposite the upper margin of the handholes to permit entry of fingers around the upper margin of the handhole and between the inner surface of the end panel and the adjacent surface of the flap. Each end wall panel is preferably made of triple-folded material with the flap being cut out of the inside face of the material and the handhole being cut through the other two thicknesses.

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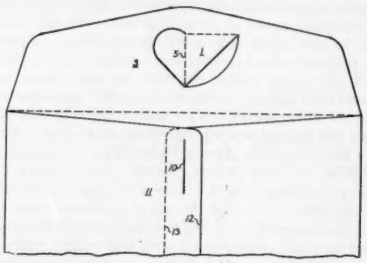
**3,788,539**
**ENVELOPE LOCK**
**Paul Vjecsner, 350 W. 51st St., New York, N.Y.**
**Filed Oct. 28, 1971, Ser. No. 193,325**
**Int. Cl. B65d** *27/22*
**U.S. Cl. 229—77** **3 Claims**



In an envelope, a lock which is an integral part of the material, comprising a locking-flap on the envelope-flap, and a locking-slit in the envelope-wall confronting it. After closing of the envelope, locking-flap is inserted into slit, and held secure in it due to the relative positions of the elements.

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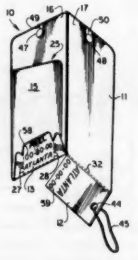
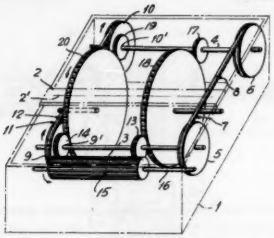
**3,788,540**
**TRAVEL ENVELOPE WITH BAGGAGE TICKET AND BAGGAGE CLAIM TICKET**
**David G. Sammons, 5 Haynes St. S.W., Atlanta, Ga.**
**Filed Feb. 22, 1972, Ser. No. 227,815**
**Int. Cl. B65d** *27/08*
**U.S. Cl. 229—72** **6 Claims**



A travel envelope for enclosing an airline ticket is disclosed which includes as an integral part thereof a baggage ticket which can be torn away therefrom and attached to the baggage of the traveler with a string. A baggage claim ticket is also detachably connected to the envelope. Duplicate indicia are applied to both the baggage ticket and baggage claim ticket for identifying purposes.

3,788,541
**COMPUTATION DEVICE AND METHOD**
Norman Garner, 69-10 Yellowstone Blvd., Forest Hills, N.Y.
Filed Sept. 15, 1972, Ser. No. 289,279
Int. Cl. G06c *29/00, 27/00, 3/00*
U.S. Cl. 235—61 R 17 Claims



A computation device for performing the mathematical operations of multiplication and division is disclosed. The device has a housing in which an indicator is fixedly located. There is a first logarithmic scale mounted in the housing so as to be movable with respect to the indicator. A second logarithmic scale is mounted so as to be movable adjacent the first scale and a gearing arrangement is provided which is engageable with the first and second scales for fixing the positions of the scales with respect to each other and for jointly moving the scale with respect to the indicator. The computation device can be used for converting a value in one set of units directly into a value in another set of units by providing a third logarithmic scale movable in fixed relation with the first scale. A method of converting from a value in one set of units to a value in another set of units using the computation device according to the invention is also disclosed.

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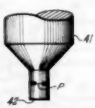
3,788,542
**ENVIRONMENTAL CONTROL METHOD AND APPARATUS**
Thomas R. Mee, Altadena, Calif., assignor to Mee Industries, Inc., Altadena, Calif.
Filed Dec. 31, 1970, Ser. No. 103,170
Int. Cl. E01h *13/00*; A01g *15/00*; B05b *1/26*
U.S. Cl. 239—2 R 20 Claims



Control of the temperature and humidity of an environment is obtained by injecting a large volume of water droplets into the air with a major portion of the water droplets being in the range of from about 5 to 50 microns in diameter and with an average diameter in the range of from about 10 to 30 microns. In one embodiment such environmental control is employed for cooling an outdoors area wherein the droplets provide evaporative cooling. When temperatures are low a fog of water droplets essentially opaque to infrared is provided as a cover to crops for preventing frost damage. In another embodiment means for injecting water droplets are arranged within a roofed shelter having sides open at the top and bottom for permitting air circulation. In another embodiment a visible cloud is provided for decorative effect or as a medium on which an image can be projected.

Fog having droplets in the above-mentioned size range is produced by impacting a stream of water having a diameter in the range of from about 125 to 400 microns at a velocity in excess of about 135 feet per second against a smooth, solid surface. Such impact causes the stream of water to separate into droplets in the selected size range. In one embodiment a nozzle having an orifice in the range of from about 125 to 400 micron diameter and operated at a pressure in excess of about 350 psi is used to create a water jet. A flat surface having substantially the same diameter as the orifice, normal to the orifice, closely aligned with the orifice, and spaced only a short distance from the orifice is employed for impacting the stream coming out of the orifice. In another embodiment a surface having compound convexity is arranged in front of the orifice at a distance of up to about four millimeters. A complete system involves a large plurality of such nozzles supplied with water substantially free of particles having a size larger than about 1/10 the diameter of the orifice, and at a pressure in excess of about 350 psi. Automatic control of such a system in response to temperature and wind velocity and direction is also provided.

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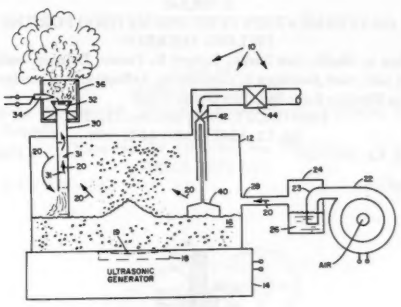
3,788,543
**UNIFORM SIZE PARTICLE GENERATOR**
Pierre St. Amand, and Irwin Koff, both of China Lake, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.
Filed Sept. 14, 1972, Ser. No. 289,202
Int. Cl. A01g *15/00*
U.S. Cl. 239—2 R 10 Claims




A method and apparatus is disclosed for generation of fine particles, for example of silver iodide, from a nebulizer for cloud seeding. The nebulizer comprises a large container in which is maintained a constant level of a combustible or highly volatile solution such as an acetone solution of silver iodide. An ultra-sonic generator in the base of the container produces micron size droplets of the solution in the airspace above the solution. The droplets are forced out of the container by a stream of solvent laden air into a burner or vent which burns or evaporates the solvent. Fine particles of the solute silver iodide remain for the cloud seeding operation.

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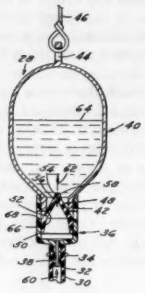
3,788,544
**AGRICULTURAL IRRIGATION SYSTEM**
Onni S. Koskinenm, West Bloomfield, Birmingham, Mich.
Filed Feb. 2, 1973, Ser. No. 328,950
Int. Cl. B05b *17/04*
U.S. Cl. 239—11 16 Claims

An agricultural irrigation system is provided wherein a plurality of relatively small water storage emitters are located in a

land area to be irrigated. Means are provided to simultaneously fill all of the emitters from a central source of water



pressure and them simultaneously to actuate each emitter for flow of water therefrom for irrigation purposes.

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**3,788,545**

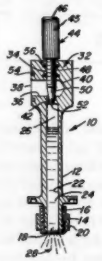
**GAS PERMEATION TUBE AND METHOD FOR THE FILLING THEREOF**

**Allan L. Budd, San Diego; Robert E. Foster, Delmar, both of Calif., and Jonathan S. Greenberg, Arlington, Va., assignors to Monitor Labs Inc., San Diego, Calif.**

**Filed Dec. 27, 1971, Ser. No. 212,272**

**Int. Cl. A24f *25/00*; A61l *9/04***

**U.S. Cl. 239—34** **6 Claims**



A first permeation tube embodiment has a housing with exterior circular grooves at one end thereof. A gas permeable, Teflon membrane is fitted over the grooved end and an annular retaining ring is then press fitted over the grooved end to create a tortuous seal. An opposite end of the housing contains a needle valve inlet through which a precisely metered volume of gas is introduced by a gas transfer technique.

A second permeation tube embodiment includes a container from which liquified gas flows to envelop the exterior surface of a tubular membrane. Air flows through the membrane to dilute gas permeating inwardly through the membrane.

**3,788,546**

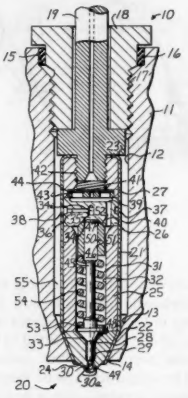
**FUEL INJECTION SYSTEM**

**John M. Bailey, Dunlap; Stanley J. Kranc, Morton, and Richard A. De Keyser, Edelstein, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.**

**Filed June 26, 1972, Ser. No. 266,137**

**Int. Cl. B05b *1/30***

**U.S. Cl. 239—120** **8 Claims**



There is disclosed a fuel injection nozzle and valve assembly having a closed leakage collection chamber surrounding the valve assembly. The collection chamber comprises an annular chamber defined by the valve housing and a bore formed in the cylinder head of an engine.

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**3,788,547**

**SPRAYING APPARATUS**

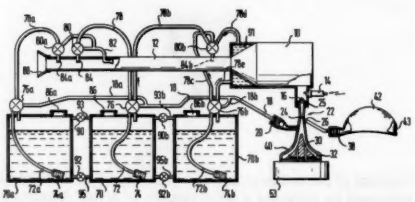
**Karl-Heinz Stahl, Zum Felchen 20, Nussdorf/Bodensee, Germany; Werner Stahl, Nussdorf/Bodensee, and Fritz Fend, Regensburg, both of Germany, assignors to said Karl-Heinz Stahl, by said Werner Stahl and Fritz Fend**

**Filed Mar. 30, 1973, Ser. No. 346,284**

**Claims priority, application Germany, Apr. 5, 1972, P 22 16 415.4**

**Int. Cl. B05b *1/24, 7/28, 9/00***

**U.S. Cl. 239—129** **3 Claims**



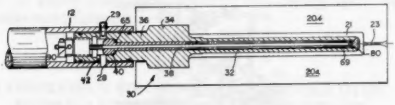
In a spraying apparatus in which a liquid is atomized by a pulsating stream of combustion gases discharged through an elongated exhaust pipe from a combustion chamber equipped with a carburetor for use of liquid fuel, the exhaust pipe is equipped with at least two atomizing nozzles. One nozzle near the free orifice of the exhaust pipe is fed the active agent to be sprayed, and the other nozzle near the combustion chamber is supplied with water or similar cooling liquid which evaporates in the combustion gases and cools the same sufficiently to permit a dispersion of heat-sensitive insect pathogens, such as *Bacillus thuringiensis*, to be atomized at the nozzle near the exhaust pipe orifice.

3,788,548

## CONTROL TEMPERATURE BLOW STICK FOR INJECTION MOLD APPARATUS

Helmut O. Hentsch, Chicago, Ill., assignor to Continental Can Company, Inc., New York, N.Y.

Filed June 5, 1972, Ser. No. 259,893
Int. Cl. B05b *15/00*
U.S. Cl. 239—132.3 5 Claims



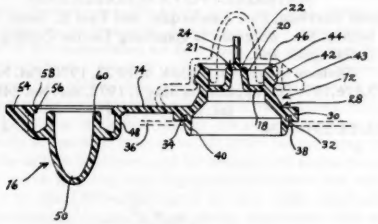
An improved blow stick for receiving and forming a thermoplastic parison within an injection mold and includes elongated core forming member having a bore therethrough. A second hollow member is carried within said bore and is provided with an exterior surface which mates with the surface of the bore to form cooling passages for the circulation of a cooling fluid. Additionally, sources of cooling fluids and expansion fluids are connected to said cooling passages and to said hollow member for respectively transferring heat from a parison formed on the core forming member and for subsequently expanding the parison against an expansion mold.

3,788,549

## PLASTIC DISPENSING NOZZLE WITH POURING SPOUT WITH REMOVABLE SEAL

Efrem M. Ostrowsky, Highland Park, Ill., assignor to Federal Tool & Plastics, a Division of VCA Corporation, Chicago, Ill.

Continuation of Ser. No. 165,674, July 23, 1971, abandoned.
This application Dec. 15, 1972, Ser. No. 315,344
Int. Cl. B65d *17/24*
U.S. Cl. 239—309 2 Claims



A plastic nozzle in combination with a closure cap in which the mouth of the nozzle has a central pouring spout and removable sealing means therefor, which when removed opens the pouring spout.

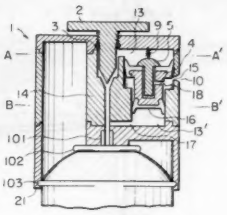
3,788,550

## AUTOMATIC INTERMITTENT SPRAY VALVE FOR PRESSURIZED PACKAGING

Shigeo Nishiguchi, Shimo-Tsuga, and Masahiko Okatani, Fujisawa, both of Japan, assignors to Tokusyu Aerosol Company, Ltd., Tokyo, Japan

Filed Oct. 6, 1972, Ser. No. 295,789
Int. Cl. B65d *83/14*
U.S. Cl. 239—337 5 Claims

An automatic intermittent spray valve for pressurized packaging or aerosols comprising a piston cylinder which is composed of a greater diameter section and a smaller diameter section, both sections being communicated with the discharge valve of a pressurized package container. A channel connecting said discharge valve and the greater diameter section is choked by a flow regulating means, a needle valve for instance. As the contents of the pressurized package container (liquefied gas composition) enters the greater diameter section of the piston cylinder at a controlled rate, the free piston



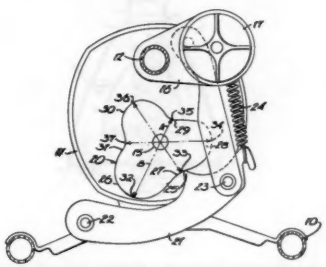
moves toward the smaller diameter section and effects spraying when the piston has moved to some extent. After the spraying is effected, the free piston returns to the initial position and thus intermittent spraying is repeated. This valve can be used for the conventional pressurized packaging and intermittent spraying is effected at constant intervals regardless of change in the ambient temperature.

3,788,551

## SPRINKLER DRIVE

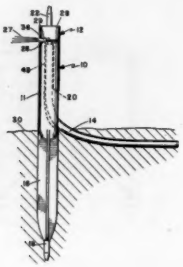
George M. Standal, 1916 San Fernando Pl., Victoria, B.C., Canada

Filed Oct. 24, 1972, Ser. No. 299,751
Int. Cl. B05b *3/16*
U.S. Cl. 239—242 9 Claims



An oscillating sprinkler drive for pivotally moving the spray tube of an oscillating sprinkler in partial overlapping oscillational movements to facilitate even distribution of water over a rectangular area. The drive primarily comprises a drive cam and a follower arm which are operatively connected to the spray tube through conventional linkage. The cam is designed to reverse movement of the spray tube at preselected angular positions between angular limits set by the conventional linkage. By strategically locating these reversing points, more water may be directed toward the center of the spray pattern to compensate for the dwell of the spray tube at the angular limits.

3,788,552
SPRINKLER UNIT
James C. Roberts, 530 Broadway, Escondido, Calif.
Filed Apr. 6, 1973, Ser. No. 348,761
Int. Cl. A62c 31/22
U.S. Cl. 239—276 4 Claims



A sprinkler unit having a tubular portion supported in the ground for passing a water supply conduit from the ground to a sprinkler cap to direct water against an inverted platform on the cap that is open to one side.

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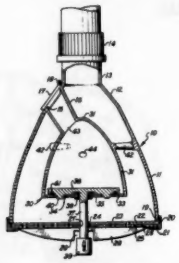
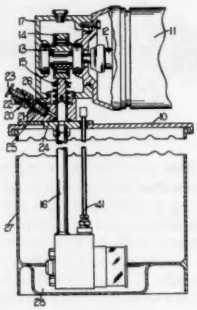
3,788,553
SHOWER WITH OIL RESERVOIR
Gertrude E. Heckman, 4395 W. 4th St., Reno, Nev.
Filed Feb. 28, 1973, Ser. No. 336,822
Int. Cl. B05b 1/18, 7/28
U.S. Cl. 239—315 7 Claims



This specification discloses a shower with oil reservoir comprising two basic elements. These are a shower head that is generally conventional and a reservoir for bath oil mounted within the head. A tubular filling spout extends from the reservoir to the head, adjacent to the upper end of these members with its outer end having a removable closure. A perforated plate constitutes the lower end of the reservoir and cooperating therewith is a valve plate within the reservoir and mounted on the upper end of a plunger that is reciprocal in a central opening in the perforated plate and extends through a hole in the end plate assembly of the head. The lower end of the shower head takes the form of a pair of perforated plates, the inner of which is fixed while the outer plate is rotatable by a fin depending therefrom to adjust the amount and character of the oil water mixture emitted from the head.

3,788,554
LIQUID SPRAYING APPARATUS
Frank Guise, Tamworth, England, assignor to Binks-Bullows Limited, Brownhills, Staffordshire, England
Filed Aug. 4, 1972, Ser. No. 278,051
Claims priority, application Great Britain, Aug. 6, 1971, 37,030/71
Int. Cl. B05b 9/04
U.S. Cl. 239—332 4 Claims



Liquid spraying apparatus especially, but not exclusively for use in paint spraying operations, the apparatus comprising a conduit which has at one end a piston reciprocable by power-operated means and which is connected at its other end to a diaphragm pump, said pump being actuable by pressure applied to a column of liquid in said conduit by said piston, the diaphragm having a liquid inlet which is disposed adjacent to the pump and having an outlet which is connected to one end of a further conduit adapted at its other end to be connected to a spray gun.

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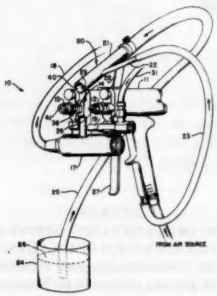
3,788,555
APPARATUS FOR PROJECTING PLURAL COMPONENT MATERIAL UPON A SUITABLE BASE
David Harrison, Fort Lauderdale, and Paul R. Sainz, Miami, both of Fla., assignors to Ransburg Electro Coating Corp., Indianapolis, Ind.
Division of Ser. No. 32,064, April 27, 1970, Pat. No. 3,676,197. This application May 1, 1972, Ser. No. 248,968
Int. Cl. B05b 7/14
U.S. Cl. 239—336 4 Claims



An apparatus for and a method of providing a mixed spray of a plural component material and curing agent with granular material entrained in the mixed spray. The apparatus includes curing agent spray means, outboard plural component material spray means flanking the curing agent spray means and

granular material dispensing or emitting means. The outboard spray means includes a plurality of spaced apart spray nozzle means inclined toward each other so as to provide converging sprays of the plural component material. The sprays are adapted to converge and intersect externally of the apparatus prior to deposition upon a surface. The curing agent spray means provides a spray of curing agent which intersects and mixes with the sprays of the plural component material. Granular material entrained in a fluid medium mixes with the sprays of plural component materials so as to provide a mixed spray of plural component material and curing agent with granular material entrained therein.

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**3,788,556**

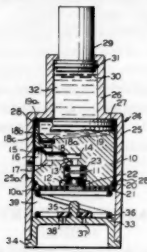
**COMPRESSED AIR OPERATED DISPENSER WITH HYDRAULIC FORCE MULTIPLYING MEANS**

**Pasquale R. Riccio, Salem, N.H., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Continuation-in-part of Ser. No. 240,026, March 31, 1972, abandoned. This application Feb. 28, 1973, Ser. No. 336,699**

**Int. Cl. B05b** *11/00*

**U.S. Cl. 239—349** **3 Claims**



A fluid product dispenser using compressed air as a dispensing medium. The device has a valve assembly with a valve body which has a compressed air flow path therethrough and a valve member movable in the valve body and obturating said compressed air flow path. Aspirating means is provided at one end of the compressed air flow path, and a product flow path extends from a product containing means to the aspirating means. The device has a hollow enclosure around the other end of the compressed air flow path, and a piston means closes the hollow enclosure. Either the piston means or the valve body is movable relative to the other for reducing the size of the hollow enclosure and for bringing the piston means and the valve member into engagement to move the valve member to open the compressed air flow path. Hydraulic force multiplying means is operatively associated with the piston means and valve body for moving the piston means and valve body relative to each other. The piston means engages the valve member for opening the compressed air flow path only after air between the piston and the valve body has been compressed.

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**3,788,557**

**LIQUID INJECTION ADAPTOR**

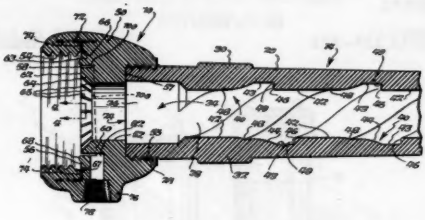
**Maurice C. Breunsbach, Hamburg, N.Y., assignor to Spirolet Corporation, North Tonawanda, N.Y.**

**Continuation-in-part of Ser. Nos. 247,207, April 24, 1972, and Ser. No. 266,393, June 26, 1972, Pat. No. 3,743,187, said Ser. No. 247,207, is a division of Ser. No. 7,747, Feb. 2, 1970, Pat. No. 3,692,243, said Ser. No. 266,393, Continuation of Ser. No. 77,880. This application Apr. 18, 1973, Ser. No. 352,193**

**Int. Cl. B05b** *7/10*; **F16k** *19/00*

**U.S. Cl. 239—401** **15 Claims**

A resiliently yieldable adaptor having a bore therethrough is provided with a liquid manifold passage at the inlet end thereof having a progressively diminishing depth to effect uniform flow of liquid through radial passages leading into the bore. Means are provided at the inlet end of the adaptor to insure centering of the hose coupling attached thereto.



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**3,788,558**

**CUTTING TORCH**

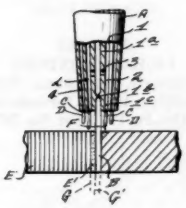
**Akira Ujiie, Kobe; Hiroshi Shimoyama, Kakogawa, and Nanji Ueda, Tokyo, all of Japan, assignors to Mitsubishiki Jukogyo Kabushiki Kaisha and Koike Sanso Kogyo Kabushiki Kaisha, 03**

**Filed Oct. 27, 1972, Ser. No. 301,369**

**Claims priority, application Japan, Oct. 27, 1971, 46/84681**

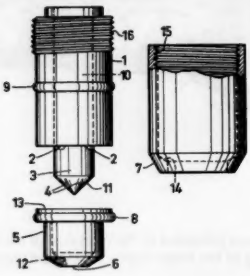
**Int. Cl. B05b** *1/34*

**U.S. Cl. 239—424** **1 Claim**



A cutting torch of divergent nozzle type having a primary cutting oxygan passage, a plurality of secondary cutting oxygen passages arranged in a ring-like form surrounding said primary cutting oxygen passage at the cutting tip, and at least one preheating flame passage arranged to surround said secondary cutting oxygen passages, said primary cutting oxygen passage having an intermediate reduced diameter portion terminating in a flared portion open at a circular nozzle outlet, and the jet of the secondary cutting oxygen from said secondary cutting oxygen passages being adapted to provide an apparent cutting oxygen outlet with a diameter equal to the inner diameter of the ring defined by said secondary cutting oxygen passages.

3,788,559
**INJECTION NOZZLE FOR LIQUID FUEL**
Johan Holger Graffman, 9, Blomsterstigen, Danderyd, Sweden
Filed Aug. 29, 1972, Ser. No. 284,493
Claims priority, application Sweden, Mar. 20, 1972, 3557/72
Int. Cl. B05b *1/30*
U.S. Cl. 239—533 5 Claims

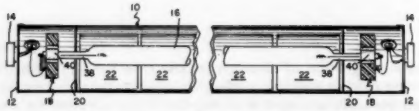



An injection nozzle for liquid fuel supplied under pulsating pressure and atomized at the nozzle opening formed between a fixed valve seat and a movable valve body which includes a fixed valve seat in the shape of a cone, a movable valve body of corresponding shape and an annular spring supported on the valve body at a distance from the nozzle opening. The nozzle opening is concentric with relation to the annular spring which supports the valve body in its cooperation with the valve seat.

**ERRATUM**

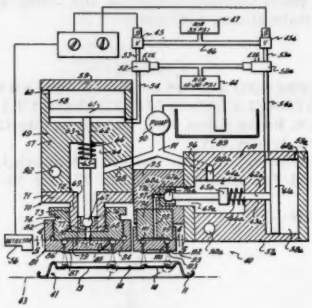
For Class 239—553 see:
Patent No. 3,788,561

3,788,560
**LIGHTING FIXTURE**
Harold L. Hough, Beverly, and Julian J. Wierzbicki, Peabody, both of Mass., assignors to GTE Sylvania Incorporated
Filed Oct. 16, 1972, Ser. No. 297,940
Int. Cl. H05b *33/02*
U.S. Cl. 240—51.11 R 3 Claims



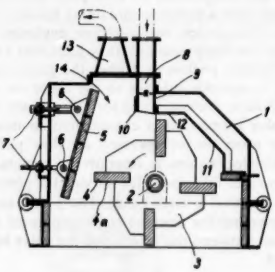

An ultraviolet lighting source for curing organic coatings is disclosed herein. The high intensity lamp of the fixture is held in a temperature resistant lamp holder that allows the lamp freedom for expansion and contraction. Also, a shield is provided to protect the critical lamp seal from the high operating temperatures generated by the lamp.

3,788,561
**APPARATUS FOR EMPLOYING SEALS TO CLOSURES FOR CONTAINERS**
Burton J. Vilagi, Amherst, and William C. Stumphauzer, South Leffield Lake, both of Ohio, assignors to Nordson Corporation, Amherst, Ohio
Filed Aug. 10, 1972, Ser. No. 279,327
Int. Cl. B05b *1/14*
U.S. Cl. 239—553.5 9 Claims



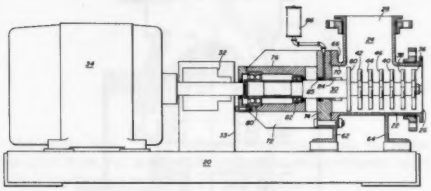
Apparatus for emplacing a seal on a closure for a container in which a seal forming material is deposited on the surface of the closure initially in a pattern of discrete droplets and fused to form a homogeneous layer.

3,788,562
**RECOVERY OF ASBESTOS FIBERS FROM ASBESTOS ORE**
Charles A. Greenlay, Asbestos, Quebec, Canada, and Ehrhardt Andreas, Munster, Germany, assignors to Hazemag Hartzerkleinerungs-Und Zement-Maschinenbau-Gesellschaft mbH, Munster, Germany
Filed Feb. 16, 1972, Ser. No. 226,887
Int. Cl. B02c *13/09*
U.S. Cl. 241—4 9 Claims




An apparatus and a method are disclosed. Asbestos ore chunks are admitted into a housing in a vertical or near vertical path and into the orbit of striking bars on a rotor which turns about a horizontal axis in the housing. Downstream of the point of contact of each chunk with the striking bars, as seen with reference to the direction of rotation of the rotor, is an impact plate and the arrangement is such that each chunk will be struck only once by the striking bar of the rotor and flung only once against the impact plate, thereby becoming crushed by the impact. A suction conduit communicates with the housing in the region where the crushing takes place so as to immediately withdraw asbestos fibers which are liberated by the crushing.

3,788,563
**COMMINUTER WITH HIGH SHEAR ROTOR AND STATOR**
Robert E. Adams, Hudson, N.Y., assignor to Columbia Precision Corporation, New York, N.Y.
Filed Feb. 2, 1972, Ser. No. 222,887
Int. Cl. B02c *13/06*
U.S. Cl. 241—46.11 5 Claims



A comminuter, particularly for blending the components of liquid adhesives, includes an axial series of impeller blades rotating on a shaft at high speed, and a peripheral series of baffle teeth stationary among the impeller blades and clearing the impeller blades by small tolerances. The arrangement is such that an adhesive mixture of organic solvent and elastomeric solid, when fed through an axial input, is blended at high speed by the impeller blades and baffles for exit through a transverse outlet that is adjacent to the innermost of the impeller blades.

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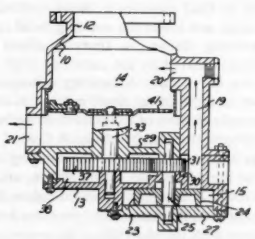
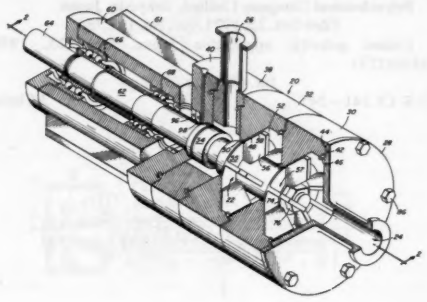
3,788,564
**WATER POWERED GARBAGE DISPOSAL UNIT**
Zennon Kokorzycki, deceased, late of 15254 Eastburn Ave., Detroit, Mich. (by Genevieve Kokorzycki, Special Administratrix)
Filed Aug. 10, 1972, Ser. No. 279,683
Int. Cl. B02c *18/40*
U.S. Cl. 241—46 A 2 Claims



A water powered garbage disposal unit characterized by the fact that all of the water that is used for flushing the garbage shredder is first used for driving such shredder, the admitted water first passing into an impeller chamber for driving the impeller and a shredder connected to it, and then passing into the shredder chamber for flushing the shredder.

The device is further characterized by the fact that it employs driving gears which are sealed from communication with the shredder area or chamber so that garbage within such shredder chamber will not come in contact with the driving gears. Equally, the impeller chamber is sealed from the shredder chamber so that garbage in the shredder chamber will not come in communication with the impeller.

3,788,565
**ULTRA FINE COLLOID MILL**
Robert E. Adams, Hudson, N.Y., assignor to Columbia Precision Corporation, New York, N.Y.
Filed Feb. 2, 1972, Ser. No. 222,884
Int. Cl. B02c *21/00*
U.S. Cl. 241—46.11 16 Claims



A colloid mill is characterized by a stator and a rotor disposed along an axis. The stator has a re-entrant conical surface with grooves extending from the outer periphery to an inner axial opening. The rotor is keyed to a shaft that extends through the axial opening of the stator and has vanes with outer edges that are closely adjacent to and in registration with the conical surface of the stator. The arrangement is such that the high speed rotation of the rotor causes fragmentation of colloid particles in a fluid that is driven under pressure from an inlet through the small clearance between the conical surface of the stator and the vanes of the rotor and through the clearance between the axial opening of the stator and the shaft of the rotor.

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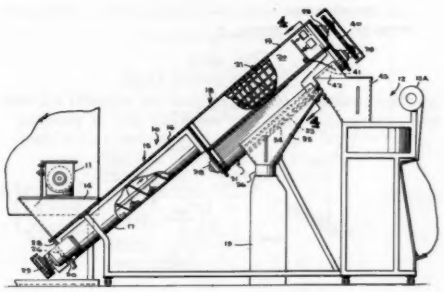
3,788,566
**CUBE ICE SEPARATOR AND SCREENING APPARATUS**
William F. Morris, Jr., 801 Fayetteville St., Raleigh, N.C.
Filed May 15, 1973, Ser. No. 360,613
Int. Cl. B02c *9/04*
U.S. Cl. 241—73 16 Claims



A cube ice separator and screening machine for subdividing plural cube ice segments of connected cubes into disconnected individual cubes and separating smaller size fine pieces of ice therefrom, including an upwardly inclined conveyor screw and housing for feeding the ice along an upwardly inclined feed path. A network of rods forms an open ended cylindrical cage surrounding the conveyor screw along the upper portion of the feed path for breaking up the ice frag-

ments into individual cubes and passage of the cubes through sized openings between the rods to a second conveyor station where the cubes and fine ice pieces are discharged along separate paths.

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**3,788,567**

**DISPOSING DEVICE FOR SYNTHETIC RESIN WASTE**

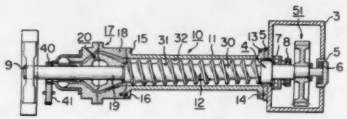
**Masatora Yamada, Iwata, Japan, assignor to Mitsubishi Petrochemical Company Limited, Tokyo-to, Japan**

**Filed Oct. 22, 1971, Ser. No. 191,754**

**Claims priority, application Japan, Oct. 23, 1970, 45/093733**

**Int. Cl. B02c** *23/02*

**U.S. Cl. 241—247** **3 Claims**




Device for disposing of synthetic resin waste wherein the waste material of different kinds, such as polyvinyl chloride resin waste, and polyethylene resin waste mixed with sand, paper, metal pieces, etc. is processed by melting and binding the synthetic resin component in such waste material for subsquent use.

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**3,788,568**

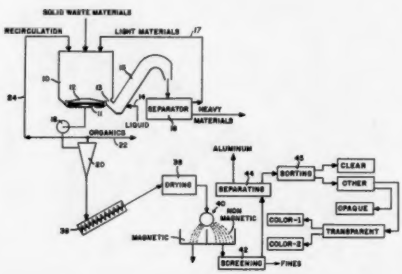
**RECOVERY OF SALVAGEABLE COMPONENTS FROM WASTE MATERIAL**

**Paul G. Marsh, Middletown, Ohio, assignor to Black Clawson Fibreclaim, Inc., New York, N.Y.**

**Division of Ser. No. 99,986, Dec. 21, 1970, Pat. No. 3,720,380. This application Jan. 2, 1973, Ser. No. 320,445**

**Int. Cl. B02c** *18/40*

**U.S. Cl. 241—69** **2 Claims**




Glass and aluminum are recovered from a mixture of solid waste, such as municipal waste, by reducing the frangible portions of the waste to a size less than a preselected maximum size, centrifugally treating the reduced portions to divide the glass, aluminum and other inorganics from the fibrous and other organic components, separating the aluminum from the glass and other inorganics, and segregating the colorless glass from the remaining, relatively opague inorganics.

**3,788,569**

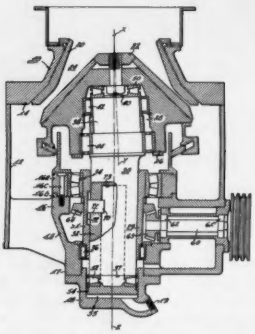
**CRUSHER WITH HYDRAULICALLY ADJUSTED ROTARY ASSEMBLY FOR SUPPORTING AND GYRATING A CONICAL HEAD**

**Robert H. Kemnitz, Appleton, Wis., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.**

**Filed Nov. 16, 1972, Ser. No. 307,049**

**Int. Cl. B02c** *2/04*

**U.S. Cl. 241—214** **5 Claims**



A gyratory crusher is disclosed having a two-piece central upright rotating cam assembly for supporting and camming a crushing head to gyrate relative to a surrounding stationary concave carried by a frame. The two-piece rotating assembly comprises a cylindrical sleeve journaled in a lower portion of the crusher frame to rotate about a vertical axis, and a shaft having a lower portion journaled in the sleeve for vertical movement relative to the sleeve and with the lower shaft portion keyed to the sleeve to rotate with the sleeve. An upper portion of the shaft cams the head to gyrate by being inclined relative to the lower and vertical portion of the shaft, with a central axis of the upper shaft portion intersecting a vertical central axis of the lower shaft portion at a point above the shaft. A piston is arranged beneath the lower portion of the shaft, operable by fluid pressure to move vertically relative to the frame to raise and lower the rotating head camming shaft within the rotating sleeve, to thereby adjust the spacing between the head carried by the camming shaft and the concave carried by the frame. A bearing arrangement for the rotating sleeve and the lower shaft portion is also disclosed, which in one embodiment of the invention includes a pair of self-aligning spherical roller bearings. A first of the spherical roller bearings is arranged between the rotating sleeve and the frame adjacent the upper end of the sleeve, and a second of the spherical roller bearings is arranged below the sleeve and between the shaft and the frame, and provides for the sleeve to maintain contact with the shaft along the entire axial length of the sleeve.

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**3,788,570**

**SPINNING REEL FOR FISHING**

**Tatsuya Yamazaki, Fuchu, and Yasomatsu Morishita, Kure, both of Japan, assignors to Ryobi Ltd., Fuchushi, Hiroshima-ken, Japan**

**Filed Aug. 4, 1971, Ser. No. 168,864**

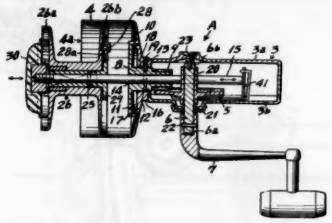
**Claims priority, application Japan, Dec. 12, 1970, 45-124086; Mar. 4, 1971, 46-13928; Apr. 28, 1971, 46-33804**

**Int. Cl. A01k** *89/00*

**U.S. Cl. 242—84.21 R** **3 Claims**

A fishing spinning reel having a unitary rotor, gear pipe, and pinion engaging a unitary crown gear and axis pipe which has a polygonal bore, at a point skew to the radius of the crown

gear. The rotor is retained in the main body by a stopper plate which is inserted in a radial slot on the gear pipe through a slit



in the main body. The bail roller assembly has its roller separated from its axis by an oil-absorbent synthetic resin which is uneffected by water.

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**3,788,571**

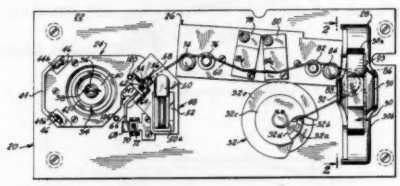
**TAPE CARTRIDGE LOADING AND POSITIONING SYSTEM**

**Leslie P. Finster, Ilion; Richard J. Petkovsek, Middleville; Trevor D. Reader, New Hartford; Warren A. Reynolds, Ilion, and William A. Sours, Sauquoit, all of N.Y., assignors to Cogar Corporation, Wappingers Falls, N.Y.**

**Filed Jan. 8, 1971, Ser. No. 104,933**

**Int. Cl. G11b** *15/66, 23/10*

**U.S. Cl. 242—195** **23 Claims**



A tape deck utilizing a loader for properly positioning a tape cartridge is disclosed. The cartridge includes an internal supply reel which is adapted to rotate freely within the cartridge housing when the cartridge is mounted, by means of the loader, onto the supply drive spindle. A spring in the supply drive spindle forces the supply reel to assume the free rotation orientation during the mounting step. The loader, which is hinged to the tape deck, receives the cartridge therein when the loader is in its elevated "loading" position. The loader is then lowered down to the tape deck; the position of the cartridge within the loader is such that lowering the loader causes an eyelet attached to the recording tape in the supply reel of the cartridge to be affixed to a clasp attached to the permanent leader element coupled to the tape deck take-up reel. The loader is initially locked in place by the closing of a locking lever, which also serves to unblock the tape travel path by withdrawing a lug adjacent to the leader clasp. When tape advance commences, the movement of the leader clasp activates an auxiliary lock which, independently of the locking lever, prevents the loader from being prematurely elevated while any tape is still out of the cartridge. A plurality of electromechanical sensors on the tape deck is responsive to the loading and locking steps to initiate specific electronic actions relating to the tape drive and the data control functions performed by the system electronics.

**3,788,572**

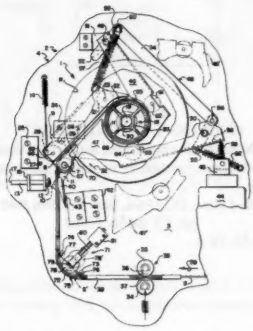
**STRIP TAKE-UP THREADING DEVICE**

**Richard J. Wroblewski, Fairport, N.Y., assignor to Eastmak Kodak Company, Rochester, N.Y.**

**Filed May 3, 1971, Ser. No. 139,531**

**Int. Cl. B65h** *75/28, 25/04*

**U.S. Cl. 242—210** **3 Claims**



A take-up device, adapted to receive a reel on a rotatable support member of such device and to wind strip material onto a reel so received, is provided with a plurality of guide members which are movable to respective threading positions surrounding a received reel for snubbing a leading portion of strip material onto the received reel. One of the guide members is movable to several sensing positions (1) for detecting the presence at the support member of a reel without strip material wound thereon, (2) for detecting the absence of a reel at the support member and (3) for detecting the presence at the support member of a reel with a predetermined length of strip material wound thereon. A control is operatively associated with the sensing guide member and a strip feeding mechanism for preventing strip threading either in the absence of a reel at the support member or should a reel with a predetermined length of strip material wound thereon be received on the support member. Upon snubbing of a leading portion of a strip material onto a received reel, a succeeding portion of such material is tensioned and a strip tension sensor of the take-up device actuates retraction of the guide members other than the sensing guide member from the outermost convolution of strip material wound on the received hub.

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**3,788,573**

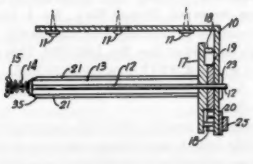
**ROLL PAPER DISPENSER**

**John Ira Thomson, and Ralph T. Hensley, both of Lansing, Ill., assignors to The Raymond Lee Organization, Inc., New York, N.Y., a part interest**

**Filed Feb. 7, 1972, Ser. No. 224,081**

**Int. Cl. B65h** *49/00;* **D01h** *7/16*

**U.S. Cl. 242—55.2** **3 Claims**



A roll paper dispenser for paper towels and toilet paper in which the roll is directly inserted or removed from an open

end of the rotatable spindle, being retained on the spindle by ribs which are slightly oversize the internal diameter of the paper roll. Provisions are made for regulating the frictional torque of the spindle by means of an adjustable compression spring. Provision is also made for permitting the spindle to rotate freely or to be completely restrained from further rotation, by means of a sliding lever which either clears, or interferes with projecting pins on a disc fastened to the end of the spindle.

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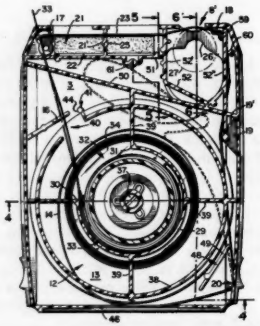
**3,788,574**

## ENDLESS TAPE CARTRIDGE

**Alfred W. Wakeman, Durham, and Robert L. Manierre, Stamford, both of Conn., assignors to Audio Devices, Inc., Glenbrook, Conn.**

**Filed Nov. 25, 1966, Ser. No. 596,940**
**Int. Cl. B65h** *17/48*
**U.S. Cl. 242—55.19 A** **28 Claims**



A tape cartridge for containing an endless coil of tape, the cartridge having a rotatable tape reel upon which the tape is wound, and openings in the cartridge along one wall thereof exposed to the tape feeding and tape recording and reproducing mechanism of a recording playback instrument with which the cartridge is to be used, the tape being wound on the reel for feeding in an open loop from the innermost convolution of the coil, past the openings in the cartridge and back to the outermost convolution of the coil.

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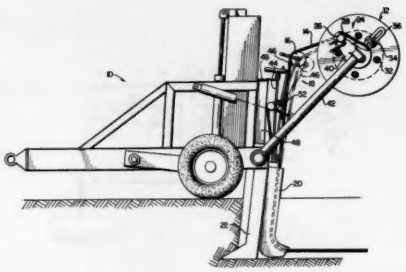
**3,788,575**

## AUTOMATIC AND SEMI-AUTOMATIC REEL TENDERS

**Clifford T. Boettcher, 3 Fawn Dr., Asheville, N.C., and David O. Creasman, deceased, Pisgah Hwy., Rt. 1, late of Candler, N.C. (by Frances S. Creasman, administratrix)**

**Continuation-in-part of Ser. No. 100,059. This application Apr. 14, 1972, Ser. No. 244,065**
**Int. Cl. B65h** *75/40, 59/00, 59/38*
**U.S. Cl. 242—86.5 R** **22 Claims**

An automatic reel tender especially adapted for use in underground cable laying operations employs a positive cable reel drive whose operation is modulated as a function of varying cable tension to match mean cable pay-out with advancement of the cable laying equipment. A hydraulic motor is in positive driving engagement with the cable supply reel and modulation of the same may be effected either by varying motor speed as a substantially instantaneous function of cable



tension or by intermittant driving of the same. In either event, a unit-handled mechanical tensiometer is relied upon to sense cable tension.

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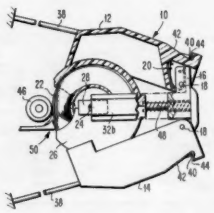
**3,788,576**

## MAGNETIC TAPE CARTRIDGE AND STORAGE APPARATUS

**Walter Siegbert Buslik, San Jose, Calif., assignor to International Business Machines Corporation, Armonk, N.Y.**

**Filed Dec. 11, 1972, Ser. No. 313,716**
**Int. Cl. G03b** *1/04;* **G11b** *15/32, 23/04*
**U.S. Cl. 242—199** **10 Claims**



A tape cartridge is formed with a normally closed split housing that encloses a partially open inner shroud within which a tape reel is mounted. When the cartridge is moved forward to a drive capstan at a read/write station, the force of a tensioned closing element is overcome to open the housing. At such time, a spring-loaded element is released to urge the shroud forward, so that the tape reel is brought into contact with the capstan. The housing has external locking parts that afford coupling a plurality of cartridges, and thus allow serial movement of the locked cartridges past the read/write station.

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**3,788,577**

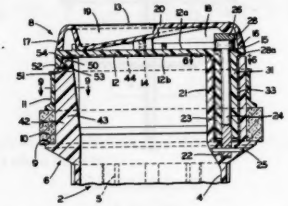
## PNEUMATIC TUBE CARRIER END CLOSURE CONSTRUCTION

**Charles B. Barnett, Akron, and Larry A. Morrison, North Canton, both of Ohio, assignors to Diebold, Incorporated, Canton, Ohio**

**Filed Dec. 16, 1971, Ser. No. 208,756**
**Int. Cl. B65g** *51/06*
**U.S. Cl. 243—35** **7 Claims**

A closure construction for an open end of a generally tubular material-conveying carrier for a pneumatic tube system, especially adapted for banking service transactions. The end closure, preferably is formed of lightweight molded plastic components, and is pivotally mounted for smooth and ready

lateral movement across an open end of the carrier body between fully closed and fully open positions. The end closure side wall is tapered enabling the carrier to move through pneumatic tube bends having reduced radii. An inturned flange is formed on the end closure and engages an outturned flange on



the carrier body when in closed position preventing axial movement of the end closure away from the carrier body. A spring-biased toggle-connected mechanism is contained in a cavity formed within the end closure to urge and hold the closure in either fully closed or fully open position.

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**3,788,578**

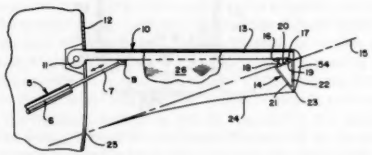
**SEMI-RIGID AIRFOIL FOR AIRBORNE VEHICLES**

**Thomas E. Sweeney, 95 Hartley Ave., Princeton, N.J.; Philip M. Condit, 7529 S.E. 40th St., Mercer Island, Wash.; Robert A. Ormiston, 1033 Crestview Dr., Mountain View, Calif., and Walter Barry Nixon, 30 Merritt Dr., Trenton, N.J.**

**Division of Ser. No. 144,861, May 19, 1971, Pat. No. 3,742,318. This application Nov. 21, 1972, Ser. No. 308,314**

**Int. Cl. B64c** *5/12, 9/34*

**U.S. Cl. 244—3.28** **7 Claims**



The present invention relates to a semi-rigid airfoil for use with airborne vehicles and capable of being folded and/or warped. The airfoil includes a rigid spar defining a leading edge and a cable defining the trailing edge with the root end thereof secured to the fuselage of the vehicle and the other end to a tip truss structure, with a flexible material forming top and bottom airfoil surfaces. Means are also provided for twisting portions of the airfoil about an axis extending through the root end, and means for pivoting the spar to fold against the fuselage.

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**3,788,579**

**AIRCRAFT CONTROL SYSTEM USING INERTIALLY SENSED DATA**

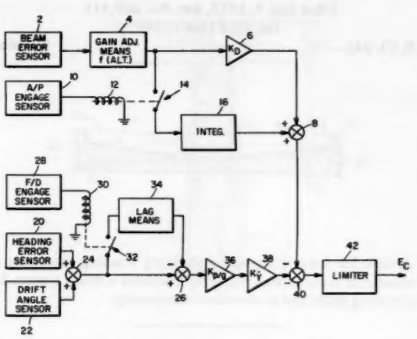
**John T. Sliney, Hackensack, N.J., assignor to The Bendix Corporation, Teterboro, N.J.**

**Filed Mar. 10, 1972, Ser. No. 233,522**

**Int. Cl. B64c** *13/20*

**U.S. Cl. 244—77 A** **5 Claims**

A system using signals available from an on-board inertial platform for controlling an aircraft through an autopilot or flight director during localizer beam capture, tracking and runway alignment modes of flight. Localizer damping is pro-




vided as a function of inertial drift angle, i. e., the angle between the heading and instantaneous ground track of the craft.

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**3,788,580**

**APPARATUS FOR MOUNTING MOVABLE DEVICES**

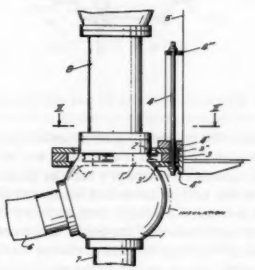
**Wolfgang Schneider, Hessheim; Egbert Diethelm Piekarek, and Stefan Thommes, both of Frankenthal, all of Germany, assignors to Klein, Schanzlin & Becker Aktiengesellschaft, Frankenthal/Pfalz, Germany**

**Filed Dec. 1, 1971, Ser. No. 203,682**

**Claims priority, application Germany, Dec. 4, 1970, 2059639**

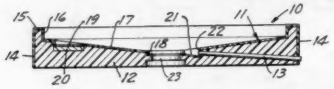
**Int. Cl. F16l** *3/16, 27/10, 43/00*

**U.S. Cl. 248—14** **21 Claims**



A substantially spherical external reactor pump has an external portion extending therefrom. Three projections, relatively short in relation to the diameter of said pump, are disposed about the external portion substantially equidistant from one another. An annular stress-transmitting member consists of three concentric annular rings which are positioned adjacent to one another and together from an annular groove arranged to mate with the projections for engagement therewith. Each of the rings is independently movable, the two exterior rings being movable in vertical directions, while the center ring is movable in radial directions. The movement of the respective rings is limited by a series of brackets which are mounted on corresponding foundations, these being positioned behind corresponding projections. The temperature variations of the brackets are minimized to effect minimum displacement of the external reactor pump, and therefore the auxiliary equipment and conduits leading thereto. In the event of a rupture in one of the conduits, the resulting forces are transmitted by way of the rings to the brackets and to the foundation.

3,788,581
**MACHINE SUPPORT BASE**
James L. Rutzick, 1540 Goodrick Ave., St. Paul, Minn.
Filed July 5, 1972, Ser. No. 269,111
Int. Cl. F16m *13/00*
U.S. Cl. 248—22 5 Claims



A base for supporting and stabilizing washing machines in domestic or commercial laundries includes a drain system for controlling spills and is vibration-dampening.

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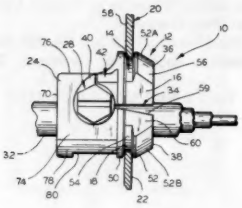
3,788,582
**CONNECTOR FOR NON-METALLIC SHEATHED CABLE**
Wesley W. Swanquist, South Bend, Ind., assignor to All-Steel Inc.
Filed Mar. 22, 1973, Ser. No. 343,905
Int. Cl. F16l *5/00*
U.S. Cl. 248—56 8 Claims



A connector for connecting non-metallic sheathed cable to electrical boxes in which the connector is an all plastic, screwless device, in the form of a tubular plastic body having a cross bore in the end of same that is to protrude from the box in which is journaled a rotary cam member that is shaped to permit ready application of the cable to the connector body in one position of the cam member relative to the body, and to indent the cable into an opposing recess formed in the connector body, in the inverted position of the rotary cam member, with the body being bisected extending from the other or mounting end of the same up to the cross bore for contraction purposes to permit application of the body mounted end into the box knock-out opening, and with the action of the cam member in indenting the cable being effective to expand the body mounting end to anchor same to the box.

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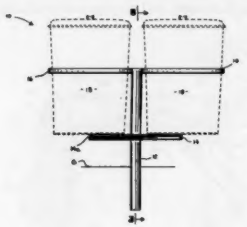
3,788,583
**GARBAGE CAN RACK**
Jerry A. Byrd, 14850 W. Dixie Hwy., North Miami, Fla.
Filed Aug. 24, 1972, Ser. No. 283,428
Int. Cl. A47g *29/00*
U.S. Cl. 248—146 1 Claim

In abstract, a preferred embodiment of the present invention relates to a rack for supporting one or more garbage cans above the ground. In particular, the rack of the present disclosure comprises a generally elongated tubular member adapted to be inserted within the ground and provided with generally transversely extending upper and lower support means for supporting and maintaining a garbage can on each side thereof. Also, the present disclosure provides a cooperable



fluid pressure system for readily inserting the garbage can rack into the ground without the use of tools or digging implements.

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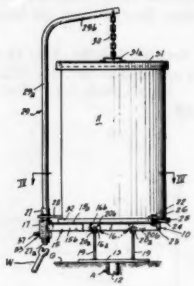
3,788,584
**CONTAINER ANCHOR RACK**
Robert F. Deike, 420 E. Fox Farm, Cheyenne, Wyo.
Filed Aug. 9, 1971, Ser. No. 169,919
Int. Cl. B65f *1/02*
U.S. Cl. 248—154 10 Claims



An inexpensive stand or rack supporting a barrel, drum, garbage can, or the like receptacle in spaced relation above the ground and having upstanding abutments and a rotatably mounted cam locking the receptacle to the rack. The abutments and cam are vertically adjustable on the rack to overlie beads or rims of different heights on the bottom periphery of the receptacles. The abutments are also adjustable toward and away from the cam to accommodate receptacles of different sizes. The rack is preferably an angle iron A-frame with the cam rotatably mounted at the apex thereof, the abutments mounted at the divergent ends of the legs and mounting bolts or anchor legs depending from cross-struts.

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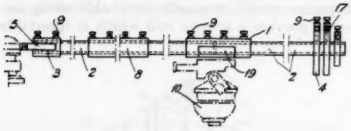
3,788,585
**STABILISER APPARATUS FOR MULTI-DIRECTIONAL MOVEMENT OF A CAMERA**
Alain Olivier Felix Masseron, 7 rue de l'Abbe Carton, Paris, France
Filed Feb. 7, 1972, Ser. No. 224,097
Int. Cl. F16m *11/20*
U.S. Cl. 248—178 23 Claims

Stabiliser apparatus for multi-directional movement of a camera which apparatus includes an arm adapted to be fitted

to a swivel support, the said arm having a swivel head with a fixing device for a camera and having means for balancing



with respect to the swivel support the weight of the said arm and its load when present.

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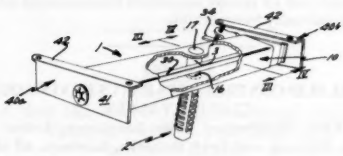
**3,788,586**
**TORSION ROD CHAIR IRON**

**Donald E. McNally, Grand Rapids, Mich., assignor to Steelcase Inc., Grand Rapids, Mich.**

**Filed Dec. 12, 1969, Ser. No. 884,413**
**Int. Cl. A47c** *3/023*
**U.S. Cl. 248—373** **7 Claims**



A torsion bar chair iron in which a tubular housing member of rectangular cross section is secured to the spindle of a chair base. The spindle passes laterally through the tubular housing and is secured at the top and bottom thereof. A torsion bar passes longitudinally through the housing member, passing adjacent the spindle. It is fixed in one end of the housing but is rotatable in the other end thereof. At the rotatable end, outside of the housing, a lever is fixedly secured to the torsion bar. Chair support members are rotatably secured to the ends of the torsion bar and a chair is secured to the chair support members.

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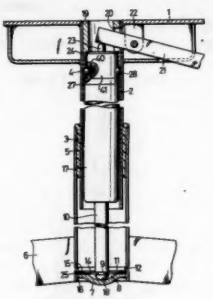
**3,788,587**
**RESILIENT COLUMN**

**Hansjorg Stemmler, Koblenz, Germany, assignor to Stabilus Industrie-und Handelsgesellschaft mbH, Koblenz-Neuendorf, Germany**

**Filed Dec. 5, 1972, Ser. No. 312,313**
**Claims priority, application Germany, Dec. 23, 1971, G 78 48 492.9**
**Int. Cl. A47c** *3/22*
**U.S. Cl. 248—400** **16 Claims**

The single column supporting the seat of a stool or chair consists of two telescoping tubes and a pneumatic spring in the communicating bores of the tubes, the cylinder of the spring being secured to the tube attached to the seat and the piston rod being secured to the tube attached to the base of the chair by a spring washer. A circumferential groove near the free end of the piston rod is engaged by tongs extending into the central opening of the spring washer so that the piston rod may be pulled loose of the base and the associated tube by manual tension. The cylinder may be attached to the seat by a variety



of fasteners which either respond to axial tension in the manner of the afore-described spring washer or may be removed manually without the use of tools.

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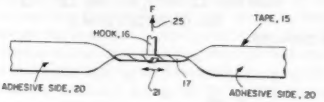
**3,788,588**
**WALL HANGER**

**Robert K. Tendler, 2913 N. St. N.W., Washington, D.C.**

**Filed Mar. 16, 1972, Ser. No. 235,174**
**Int. Cl. A47f** *7/14*
**U.S. Cl. 248—467** **12 Claims**




There is disclosed the use of a continuous strip of adhesive tape twisted on itself at a central region thereof as a hanger for supporting pictures, flat surface mounting structures and the like in conjunction with a picture hook, a protrusion from a wall or the like. The central portion is elongated to facilitate adjustment of the picture on the wall. This system has more mechanical stability than pure double-back adhesive hangers and does not have the disadvantage of adhesive strips with holes in them which preclude balancing the picture.

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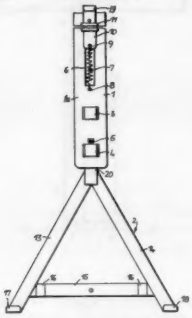
**3,788,589**
**ADJUSTABLE PICTURE FRAME HOLDER**

**Herbert Schulze, Bosperde, Germany, assignor to Firma R. Schulze & Co. KG, Bosperde, Germany**

**Filed Feb. 4, 1972, Ser. No. 223,567**
**Claims priority, application Germany, Feb. 18, 1971, P 21 08 303.4**
**Int. Cl. A47f** *7/14*
**U.S. Cl. 248—488** **7 Claims**

An adjustable holder for supporting the spaced parallel side surfaces of an object, such as a picture frame, includes a supporting part adjustably interconnected to a clamping part by an extension member which is rigidly secured to the supporting part. Supporting part has an A-shape formed by a pair of diverging legs connected adjacent their free ends by a cross member. Hooks on the free ends of the legs provide the holding action for one side of the object. The clamping part includes a metal plate containing a guide way, in which the extension member is secured by a snap spring, and a clamp held on the metal plate by another guide way and a spring member.

The clamp has a hook for securing the other parallel side of the ojbect. At the end of the metal plate spaced from the supporting part a suspension member is formed which also provides a cover for one end of the extension member. The extension member contains spaced openings in which the snap spring engages for selectively adjusting the holder.



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**3,788,590**

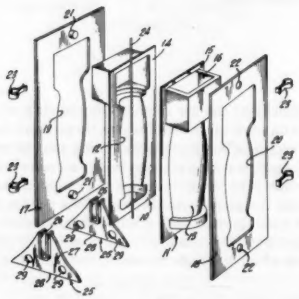
**MOLDING APPARATUS**

**Arthur Hasselbach, Cranbury, N.J., assignor to Beta Crafts, Incorporated, Hightstown, N.J.**

**Filed Feb. 22, 1972, Ser. No. 227,792**

**Int. Cl. B22d** *19/04*

**U.S. Cl. 249—95** **7 Claims**



A mold for wax, soap, plaster, and the like which includes a two part mold with each part having a peripheral flange, a pair of plates each having an opening conforming to the configuration of a mold part and means for aligning the plates in overlying relationship with the flanges of the mold parts disposed therebetween. Clips engage the plates to hold them together and means are provided to hold the mold parts and plates in an upright position.

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**3,788,591**

**CASTING MOLD APPARATUS**

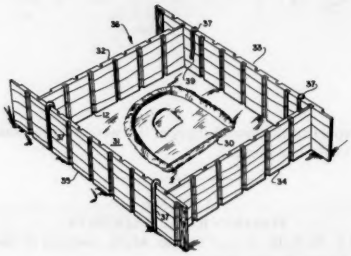
**Hilbert Arps, 1306 Piedmont Ave., Atlanta, Ga.**

**Filed Jan. 20, 1972, Ser. No. 219,271**

**Int. Cl. B29c** *1/00*

**U.S. Cl. 249—187** **4 Claims**

Apparatus from which the sides of a confined area mold can be assembled to contain a liquid or semiliquid substance for casting purposes or for other applications. One or more strips of material having a predetermined characteristic, such as the grain structure of wood, are provided with a number of spaced grooves transversely aligned relative to the characteristic of the structure on both sides thereof, and at staggered intervals. The strips are readily manually breakable along any of the grooves to provide a tongue end which is insertable within another of the grooves on a separate strip. A number of strip segments can thus be joined together in tongue-and-groove fashion to enclose an area containing a feature such as a footprint, of which a casting impression is desired to be made, thereby to provide a portable substantially leakproof casting mold which can be readily assembled from material which is compact and easily transportable.



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**3,788,592**

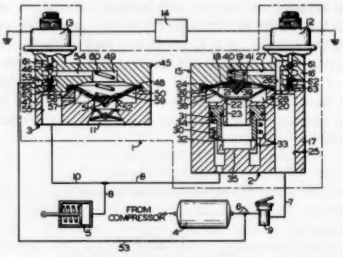
**WHEEL SLIP CONTROL APPARATUS HAVING QUICK CLOSING VALVES**

**Alfred Klatt, Wettbergen; Fritz Isernhagen, Letter; Lutz Weise, Misburg, and Erich Reinecke, Beinhorn, all of Germany, assignors to Westinghouse Bremsen-und Apparatebau GmbH, Hannover, Germany**

**Filed Oct. 24, 1972, Ser. No. 300,284**

**Int. Cl. F16k** *31/145*

**U.S. Cl. 251—25** **9 Claims**




The invention concerns a quick closing valve, in particular a disc valve for antiskid devices on street vehicles with a closing member controlling a flow of pressure medium from a chamber of higher pressure to a chamber of lower pressure.

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**3,788,593**

**FLUIDIC TIMER**

**Kenneth W. Cohen, Chesterland, Ohio, assignor to Bailey Meter Company, Wickliffe, Ohio**

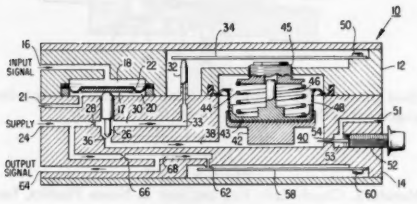
**Filed Feb. 2, 1972, Ser. No. 223,798**

**Int. Cl. F16k** *31/145*

**U.S. Cl. 251—28** **4 Claims**

Back pressure from a vane and nozzle assembly continuously supplies a timing chamber with a pressure which is sub-

stantially independent of the supply pressure variations at the vane and nozzle assembly input maintaining a predetermined chamber volume and pressure thereby. When an input signal is provided to an input chamber, a valve blocks the vane and nozzle back pressure from the timing chamber and the predetermined volume of the timing chamber is vented, with




the volume decreasing in response to timing chamber pressure drop, until an output signal from the fluidic timer is triggered. When the input signal is removed from the input chamber, vane and nozzle back pressure is restored to the timing chamber and it is reset to the predetermined volume and pressure level.

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**3,788,594**

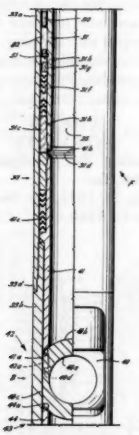
**HI-LO VALVE**

**James D. Mott, Houston, Tex., assignor to Hydril Company**

**Filed Jan. 3, 1972, Ser. No. 214,679**

**Int. Cl. F16k** *31/63*

**U.S. Cl. 251—58** **22 Claims**



A subsurface safety valve well tool securable in a well conduit for controlling flow of fluid through the bore of the conduit. An increase or decrease in the well pressure from the normal flowing pressure of the well operates a rotatable ball valve to block flow of fluid through the conduit. Increasing and then decreasing the pressure in the bore above the ball valve rotates the valve to enable flow of fluid through the conduit.

**3,788,595**

**SAFETY FLAP-VALVE**

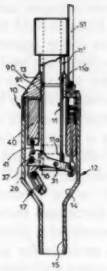
**Jean Colonna, Joinville-Le-Pont, France, assignor to Gaz De France, Paris, France**

**Filed Sept. 15, 1972, Ser. No. 289,546**

**Claims priority, application France, Sept. 21, 1971, 7133970**

**Int. Cl. F16k** *31/163*

**U.S. Cl. 251—58** **10 Claims**



A straightway safety flap-valve to be mounted on a tube conveying a pressure fluid and comprising: a collar secured to one open end of said tube and provided with a valve seat; a clack pivoted to said collar about a first axis extending outside of the surface of said tube and rotatable through 90° for engagement with and disengagement from said seat; a yoke pivoted to said collar about a second axis parallel to the first one and intersecting the surface of said tube; a third axis passing through the free ends of said yoke in parallel relation to the two first axes and also extending through said clack adjacent to its first pivot axis; control means for rocking the yoke about said second axis and acting on the closed end of said yoke; and a vertically slidable counterweight surrounding at least partially said tube end and supported through links pivoted to said counterweight and to the free ends of said yoke adjacent to said third axis.

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**3,788,596**

**VALVE FOR ABRUPTLY RELIEVING FLUID UNDER PRESSURE**

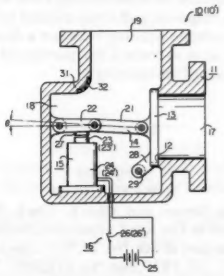
**Riichi Maeda, Yokohama, Japan, assignor to Nissan Motor Company, Limited, Yokohama, Japan**

**Filed Apr. 26, 1971, Ser. No. 137,357**

**Claims priority, application Japan, Apr. 30, 1970, 45-41413**

**Int. Cl. F16k** *35/16*

**U.S. Cl. 251—69** **10 Claims**



A valve operable to abruptly allow a fluid under pressure to flow for example to inflate safety means in an automobile

comprises a housing having a valve seat, a movable valve member seatable on the valve seat and a linkage mechanism controlling movement of the valve member. The linkage mechanism comprises first and second links constituting a toggle. The first link is pivotally connected at one end to the valve member and at the opposite end to one end of the second link the opposite end of which is pivotally connected to the housing. When the valve member is seated to close the valve the axes of the first and second links make a minor angle with one another so as to resolve the force applied to the valve member by the pressure fluid into a major component force approximately in line with the links to hold the valve member seated and a minor component force approximately normal to the axes of the first and second links and acting in a direction to unseat the valve member. In order to open the valve the linkage is movable to a second position in which the axes of the first and second links make a major angle with one another. Electromagnetic means is provided for holding the linkage in the first mentioned position against the minor component force to maintain the valve closed and for releasing the linkage to allow it to be moved to the second mentioned position by the minor component force and thereby open the valve. An extension on the valve member is pivotally connected to a portion of the housing to provide for pivotal movement of the valve member between open and closed position.

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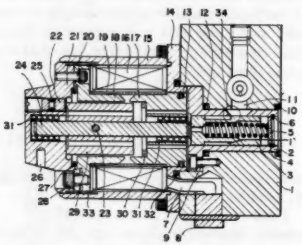
**3,788,597**
**ELECTROMAGNETIC FLOW CONTROLLING VALVE**
**Hisakazu Ichioka, Yokohama, Japan, assignor to Yukon Kogyo Company Ltd., Kanagawa-ken, Japan**
**Filed May 31, 1972, Ser. No. 258,296**
**Int. Cl. F16k** *31/06*
**U.S. Cl. 251—129** **7 Claims**



An electromagnetic flow controlling valve wherein a spring actuated by the magnetic pull force excited by a DC solenoid can provide a variable opening between a fixed sleeve and a movable spool, so as to control the quantity of flow according to the variable size of the opening.

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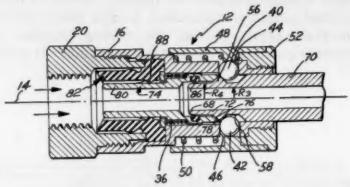
**3,788,598**
**HOSE COUPLER**
**Dale F. German, Bryan, and Allen L. Clark, Pioneer, both of Ohio, assignors to The Aro Corporation, Bryan, Ohio**
**Continuation-in-part of Ser. No. 26,957. This application Dec. 27, 1971, Ser. No. 212,055**
**Int. Cl. F16l** *37/28*
**U.S. Cl. 251—149.6** **12 Claims**

An improved coupler which includes a coupler body and a connection nipple. Upon insertion of the nipple into the coupler body, an elastically deformable valve member is opened by the action of the connection nipple to permit passage of



fluid through the coupler. Locking elements prevent disengagement of the connection nipple from the body.

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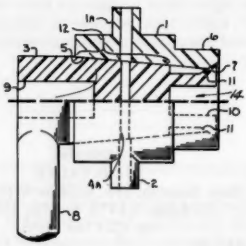
**3,788,599**
**PLUG VALVE**
**Harold S. Cloyd, Erie, Pa., assignor to Nosco Plastics, Incorporated, Erie, Pa.**
**Filed June 28, 1972, Ser. No. 267,089**
**Int. Cl. F16k** *5/02*
**U.S. Cl. 251—181** **4 Claims**



A plastic plug valve for use in equipment for administering intravenous solutions and the like in which the plug is cammed into sealing engagement with the bore in the body by spring fingers preferably integral with the plug. The valve is intended to be used once and thrown away because the cost of washing and sterilization is greater than the cost of the valve.

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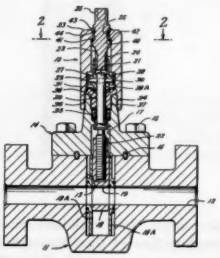
**3,788,600**
**GATE VALVE**
**Herbert Allen, Houston, Tex., assignor to Cameron Iron Works, Inc., Houston, Tex.**
**Filed Aug. 24, 1972, Ser. No. 283,571**
**Int. Cl. F16k** *41/02, 17/40*
**U.S. Cl. 251—214** **16 Claims**



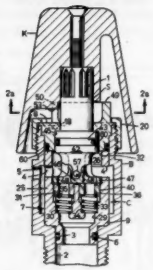
There is disclosed a gate valve having a non-rising stem which is adapted to form a metal-to-metal seal with the valve bonnet to contain pressure therein upon destruction of the primary, rubber-like stem seal.

3,788,601

## NON-RISE VALVE FOR FAUCETS OR THE LIKE

William C. Schmitt, Brown Deer, Wis., assignor to Milwaukee Faucets, Inc., Milwaukee, Wis.

Filed June 21, 1972, Ser. No. 264,779
Int. Cl. F16k 11/06
U.S. Cl. 251—304 4 Claims



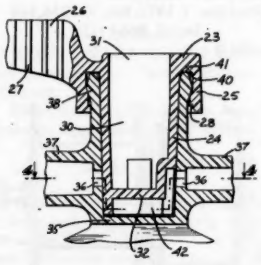
A valve for a water faucet or the like of the type which when actuated does not have a part that rises, and which valve includes a rotary sealing plate against which spring loaded seals cooperate to seal the valve when the plate is turned to the "off" position. The valve includes a cartridge which has a stem formed as one piece along with the rotary valve and which cartridge also has a two piece sleeve in which the stem rotates. The assembled sleeve is formed of an upper sleeve and a lower sleeve which are held in assembled relationship by means of a recess and projection connection, thereby the upper sleeve can be easily moved axially from the lower sleeve when the valve is to be disassembled. The valve stem can be snapped into assembled relationship with the lower sleeve to facilitate assembly of the cartridge. Stop means are provided between the upper sleeve and the handle knob to limit rotation of the knob and its associated valve stem.

3,788,602

## STOPCOCK

John Kitzie, Clifton, N.J., assignor to Becton, Dickinson and Company, East Rutherford, N.J.

Filed July 19, 1972, Ser. No. 273,333
Int. Cl. F16k 5/04
U.S. Cl. 251—312 8 Claims



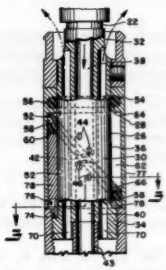
A stopcock including a hollow body member open at the top and having at least two lateral ports therein open to the exterior of the body. A key member including a sealing portion extends into the interior of the body through the open top thereof and is in sealing engagement with the interior walls of the body. A gripping portion is on the key and extends from the body. The key is rotatably positioned in the body so as to be shiftable to open and close the ports of the stopcock and regulate flow therethrough. Interengaging locking means are on the key and on the body to retain the sealing portion of the key in rotatable position within the body while permitting the gripping portion to be gripped and rotated to open and close the ports as desired.

3,788,603

## ROTARY FLOW CONTROL VALVE FOR AIR OPERATED TOOLS AND THE LIKE

Philip A. Snider, Hicksville, Ohio, assignor to Dotco, Inc., Hicksville, Ohio

Filed Apr. 16, 1971, Ser. No. 134,766
Int. Cl. F16k 3/26
U.S. Cl. 251—345 5 Claims



A small air driven tool and an air valve particularly suitable therefor. The valve has a valve body which is cylindrical. Two aligned inlet passages extend axially from opposite ends of the body but stop short of each other. Spaced apart openings communicate the passages with the outside diameter of the valve body. A valve sleeve is rotatable around the valve body and has sealing means on the inside thereof to seal the openings from each other, or alternatively to expose the openings to each other. A characteristic of the valve is that it is compact having a large flow capacity with relation to its size.

Preferably, the valve is provided with an exhaust passage extending longitudinally through the valve body offset from the inlet passages.

3,788,604

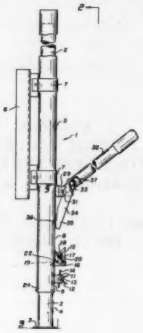
## MECHANICAL JACK

Clyde Fraser Cameron, Victoria, British Columbia, Canada, assignor to Victoria Industries Ltd., Victoria, British Columbia, Canada

Filed May 25, 1972, Ser. No. 256,982
Int. Cl. B66f 1/04
U.S. Cl. 254—108 7 Claims

A camper jack of the kind in which two tubes are provided, the first tube being telescopically movable within the second and having a plurality of regularly spaced axially aligned apertures. A toothed wheel is journalled on the second tube and engages in the apertures in the first tube through a suitable

aperture provided in the wall of the second tube so as to prevent relative rotation of the two tubes. Also mounted on



the second tube are a latch and means for pivotally mounting a jacking lever carrying a pawl for engagement with the axially aligned apertures to cause extension of the jack.

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**3,788,605**

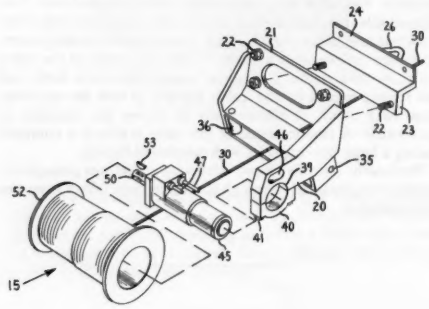
## HYDRAULIC AUTO WINCH

**George Verne Johnson, 5510 S. W. Buddington, Portland, Oreg.**

**Continuation of Ser. No. 52,173, July 6, 1970, abandoned. This application Feb. 16, 1972, Ser. No. 226,736**

**Int. Cl. B66d *3/18***

**U.S. Cl. 254—150 FH** **1 Claim**




The winch drum is mounted on the shaft of a hydraulic motor which is contained within the drum. One end of the motor protrudes from an end of the drum and is supported in cantilever fashion by a bracket which may be mounted on an automobile in a variety of different positions as, for example, on a bumper. This mounting arrangement leaves one end of the drum unobstructed to loop on a few turns of cable for alternative capstan type operation. The motor may be operated by fluid pressure from the power steering pump of an automobile or from a hydraulic pressure system on a boat.

**3,788,606**

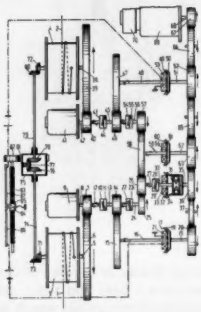
## WINCH MECHANISM FOR LOWERING A LIFEBOAT, LAUNCH OR THE LIKE, SUSPENDED FROM TWO FALLS, INTO THE WATER AND HOISTING IT OUT OF THE WATER

**Helmut Adolf Solter, Hamburg, Germany, assignor to Schat Davits Limited, London, England**

**Filed May 9, 1972, Ser. No. 251,713**

**Int. Cl. B66d *1/26***

**U.S. Cl. 254—185** **6 Claims**



A winch mechanism for raising and lowering a lifeboat includes a main drive motor having multiple power paths to a pair of drums. Selectively operable clutches are used to complete the power paths when desired. A low speed power path and a high speed power path are included and the lower speed power path includes an overrunning clutch allowing the high speed power path to predominate if the clutches of both of these power paths simultaneously are operated. Two additional power paths are included, each associated with a respective drum to drive it at a higher speed than is effected either by the low or the high speed power path. Associated with each of these additional power paths is an overrunning clutch which allow the additional power paths to overrun the main drive. An auxiliary motor is associated with each drum for taking up slack in the cables reeled on the drums and an overrunning clutch associated with each such auxiliary motor allows the requisite auxiliary drive overrun. Additionally, a compensating control is used to maintain the boat level.

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**3,788,607**

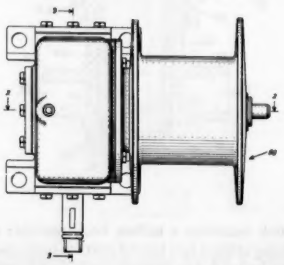
## WINCH MECHANISM

**James W. Crooks, Milwaukee, Wis., assignor to R. L. Smith Gear Company, Milwaukee, Wis.**

**Filed Jan. 7, 1972, Ser. No. 216,146**

**Int. Cl. B66d *1/28***

**U.S. Cl. 254—186 R** **3 Claims**



This invention relates to a winch mechanism comprising a closed gear housing which contains a worm and wheel as-

sembly having an output shaft journaled in spaced bearings supported in the housing. One portion of the housing is formed as an elongated hollow support having a distal end in which one of the bearings is mounted. The shaft projects beyond the distal end. A cylindrical pulley of cup-shaped configuration is secured to the distal end of the shaft in such manner as to encircle the elongated portion of the housing, the bearing in the distal end of the housing being situated substantially midway between the ends of the pulley. Radial loads on the pulley are, therefore, substantially radially imposed on the bearing such that little or no bending movement is applied to the shaft.

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**3,788,608**

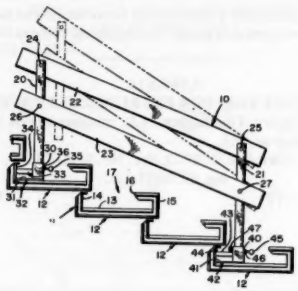
**MODULAR FOLDING RAIL**

**David W. Raymond; Robert E. Lewis, both of Champaign, and Robert E. Quigley, Mahomet, all of Ill., assignors to American Seating Company, Grand Rapids, Mich.**

**Filed Mar. 6, 1973, Ser. No. 338,504**

**Int. Cl. E04h** *17/22*

**U.S. Cl. 256—59** **5 Claims**



A hand rail is provided for a telescoping seating or bleacher structure. The hand rail includes first and second upright posts which are mounted respectively to an upper and a lower seating tier when the seating structure is in use. Upper and lower guard rails are pivotally mounted to each post. When it is desired to retract the seating structure, the guard rail is folded and transversely pivoted about one of its mounts for storage in the tread cavity of a telescoping row section.

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**3,788,609**

**MIXING APPARATUS AND METHOD**

**Stefan Leslaw Toczyski, 8336 Place Chanceaux, Ville D'Anjou, Quebec, Canada**

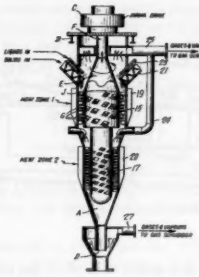
**Filed June 27, 1972, Ser. No. 266,639**

**Claims priority, application Great Britain, July 1, 1971, 30,918/71**

**Int. Cl. B01f** *7/16*

**U.S. Cl. 259—5** **8 Claims**

A mixing apparatus comprising a stator housing having a cylindrical inner wall defining a mixing chamber having an inlet and an outlet leading thereto. A rotor is supported for rotatable and reciprocal motion within the mixing chamber and defines a cylindrical rotor wall spaced from the stator inner wall. Drive means and coupling means are provided for transmitting rotatable and axial reciprocating motion to the rotor. The stator inner wall is provided with rows of spaced apart projections thereon protruding into the mixing chamber. The rotor is also provided with rows of spaced apart rotor blades which are arranged in a predetermined manner to pass between the stator projections on the inner wall of the stator. The coupling means is arranged to provide a cycloidal motion to the rotor whereby each rotor blade will pass between adjacent stator projections and wipe against them on the upward motion and pass between rows of projections on the downward motion.



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**3,788,610**

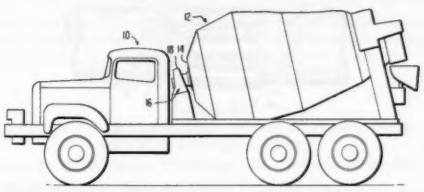
**LUBRICANT SYSTEM FOR DRIVE AND SUPPORT OF CONCRETE MIXER DRUM**

**William H. Buelow, Brookfield; William J. Mohrbacker, Milwaukee, and George Mihulowicz, Greendale, all of Wis., assignors to Rexnord Inc., Milwaukee, Wis.**

**Filed June 27, 1972, Ser. No. 266,775**

**Int. Cl. B28c** *5/18*

**U.S. Cl. 259—177** **7 Claims**



A lubricant system for the front end drive and support of a truck mounted concrete mixer includes a lubricant chamber enclosing the drive connection between the drive shaft and drum with a seal for escape of excess lubricant positioned between the drum head and a spherical surface on a stationary gear housing. Grease connections with lubricant passages leading from the gear housing to a rear shaft support bearing and from the drum head to a spherical drum support bearing provide lubricant for these bearings which then passes to the lubricant chamber. A drum retaining arrangement on the rear end of the support shaft is lubricated from a spherical support bearing and a lubricant return passage connects to the lubricant chamber.

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**3,788,611**

**SWINGING APPARATUS FOR SUPPORTING CONTAINERS FOR SEAWEED CULTURES OR THE LIKE**

**Aldo Barbini, Naples, Italy, assignor to Consiglio Nazionale Delle Ricerche, Rome, Italy**

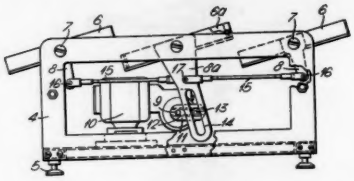
**Filed Sept. 22, 1971, Ser. No. 182,750**

**Int. Cl. B01f** *11/00*

**U.S. Cl. 259—54** **3 Claims**

An apparatus for holding containers of seaweed cultures or the like and for inducing within the cultures a rotational move-

ment has a frame with several tables for supporting the containers. The tables are mounted on horizontal shafts, and a set



of connecting rods and arms cause all of the tables to oscillate in unison with the same amplitude as one of the arms which is driven by a driving shaft.

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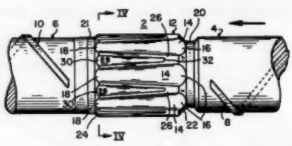
**3,788,612**

**MIXING ELEMENT FOR EXTRUDER SCREW**

**Robert F. Dray, New Castle, Pa., assignor to Feed Screws, Inc., New Castle, Pa.**

**Filed Sept. 15, 1972, Ser. No. 289,486**
**Int. Cl. B01f 7/08**
**U.S. Cl. 259—182** **11 Claims**



In an extruder screw, a mixing element disposed between two sections of the screw. The mixing element includes a plurality of spaced apart flutes extending either longitudinally or helically of the mixing element. The flutes have a constant radius and constantly vary in depth along their length. Between each flute is a land which comprises the outer surface of the mixing element.

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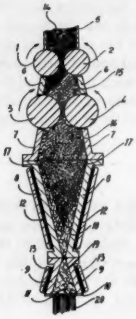
**3,788,613**

**APPARATUS FOR THE EXTRUSION OF SYNTHETIC THERMOPLASTIC MATERIALS**

**Alfonso Torrecillas Romero, Badalona, Spain, assignor to Profiltex S. A., Badalona, Province of Barcelona, Spain**

**Filed Mar. 30, 1972, Ser. No. 239,658**
**Claims priority, application Spain, Apr. 3, 1971, 389897**
**Int. Cl. B29b 1/08**
**U.S. Cl. 259—185** **5 Claims**

An extrusion apparatus for plastics material having wall means defining a chamber which diverges from the inlet to the outlet thereof. Two pairs of counter-rotating rollers are associated with the chamber and divide same into first and second series-connected accumulation chambers. The outlet of the accumulation chamber is in continuous and open communication with the inlet of a fusion chamber which converges from the inlet to the outlet thereof. An extrusion headstock is connected to the outlet of the fusion chamber and includes divergent walls which extend from the end of the fusion chamber to an extrusion gauge having plural orifices therein.



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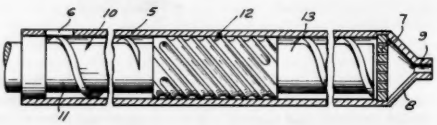
**3,788,614**

**MIXING SECTION FOR EXTRUDER FEED SCREW**

**Robert B. Gregory, Flemington, N.J., assignor to GK Systems, Inc., Flemington, N.J.**

**Filed Dec. 6, 1972, Ser. No. 312,773**
**Int. Cl. B01f 7/02**
**U.S. Cl. 259—191** **9 Claims**



This invention is directed to an extruder feed screw having an intermediate cylindrical mixing section provided on its outer surface with a plurality of concave channels of uniform depth and disposed as a plurality of interlocked helices of the same hand. In each adjacent pair of channels, the input end of one is open and its discharge end is closed, while in the other channel its imput end is closed and its discharge end is open. By this construction, dispersive and distributive mixing of the throughput are achieved more rapidly and production rates are markedly increased without degradation of the product.

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**3,788,615**

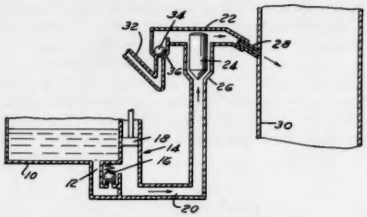
**ACCELERATOR PUMP SYSTEM**

**Gerlad B. Bishop, Dearborn, Mich., assignor to Ford Motor Company, Dearborn, Mich.**

**Filed Mar. 2, 1972, Ser. No. 231,298**
**Int. Cl. F02m 7/08**
**U.S. Cl. 261—34 A** **3 Claims**

A fuel valve that is urged toward its seat by gravity is located in the discharge passage of a carburetor accelerator pump and separates the discharge passage from an outlet passage communicating directly with the carburetor induction passage. An air vent is provided for the outlet passage and a check valve located in the air vent also is urged toward its seat by gravity. During accelerator pump operation, the air vent check valve remains on its seat and fuel flows into the carburetor induction

passage. If a low pressure develops in the outlet passage, the pressure differential lifts the air vent check valve from its seat



before the fuel valve is lifted from its seat and thereby prevents spurious fuel flow through the accelerator pump system.

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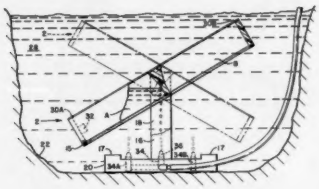
3,788,616

**AGITATING AND AERATING APPARATUS**

**Roy L. Clough, Jr., Bristol, N.H., assignor to Xodar Corporation, Warwick, R.I.**

**Filed Apr. 21, 1972, Ser. No. 246,385**
**Int. Cl. B01f** *3/04*
**U.S. Cl. 261—64 R** **20 Claims**



The invention is a system for simultaneously aerating and agitating a body of liquid. The system comprises a body that is pivotally mounted in the liquid with its pivot point located intermediate its ends, and means for feeding air to the lower side of the body. The body is adapted to trap alternately at each end sufficient air to cause that end to rise in the liquid, and means are provided for releasing the air trapped at each end of the body when that end has risen a predetermined amount, with the result that the body oscillates on its pivot axis in see-saw fashion.

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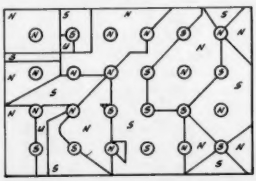
3,788,617

**CODED MAGNETIC CARD AND SYSTEM FOR ENCODING AND SENSING THE SAME**

**Walter W. Barney, 4837 Woodley Ave., Encino, Calif.**

**Continuation-in-part of Ser. No. 56,326, July 20, 1970, which is a continuation-in-part of Ser. No. 745,876, July 18, 1968, abandoned. This application June 12, 1972, Ser. No. 261,886**
**Int. Cl. G06k** *19/06;* **G11c** *11/02;* **G01d** *15/12*
**U.S. Cl. 235—61.12 M** **2 Claims**



A card is provided which includes a homogeneous sheet of magnetic material. The material and thickness of the magnetic sheet are such that portions may be permanently magnetized in a direction transverse to the plane of the sheet and with a polarity which cannot be disturbed except by directing magnetic flux in the opposite direction through the sheet. A plurality of such portions are permanently magnetized to provide a card with a plurality of magnetic poles at one face of one polarity or the other and distributed to code the card. In addition, a further irregular or random magnetizing pattern is imparted to the sheet, whereby the card magnetization is effectively scrambled to render the code undecipherable and unintelligible.

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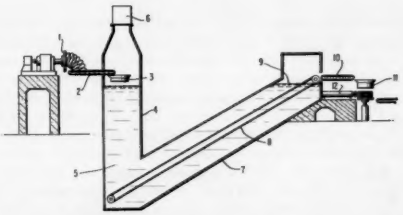
3,788,618

**METHOD AND APPARATUS FOR COOLING WIRE ROD**

**Emile Oscar Julien Van Den Bulcke, Quaide Rome, 22, Liege, Belgium**

**Filed July 6, 1971, Ser. No. 159,685**
**Claims priority, application Belgium, July 3, 1970, 42887**
**Int. Cl. C21d** *1/62*
**U.S. Cl. 266—3 R** **6 Claims**



Wire rod of indeterminate length emerging from a hot mill at elevated temperature is bent into spiral loops and fed downwardly through an aqueous cooling bath of upright cylindrical form. At the lower end of the bath, conveyor means laterally remove and elevate the wire rod from the bath.

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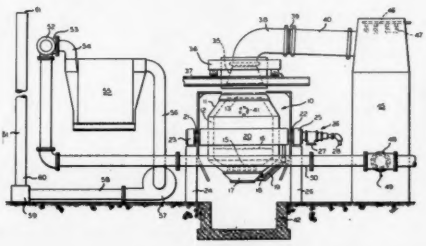
3,788,619

**STEEL CONVERTER VESSEL POLLUTION CONTROL METHOD AND APPARATUS**

**Alexander T. Dortenzo, Pittsburgh, Pa., assignor to Pennsylvania Engineering Corporation, Pittsburgh, Pa.**

**Filed Feb. 23, 1972, Ser. No. 228,528**
**Int. Cl. C21c** *5/48*
**U.S. Cl. 266—13** **2 Claims**



The hot evolved gases from a bottom blown steel converter vessel are delivered to a spray chamber near the vessel in which the gases are cooled by sufficient amount to make them acceptable to a remotely situated electrostatic precipitator in which finely divided solids are removed from the gases. The clean gas is withdrawn from the precipitator with a suction fan and delivered to a stack which discharges the gases to the atmosphere.

### 3,788,620
### DEVICE FOR SUPPORTING A HORIZONTALLY POSITIONED STRAND IN A CONTINUOUS CASTING PLANT

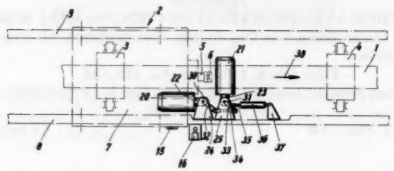
**Horst K. Lotz, Wallau, Germany, assignor to Ge Ga Gesellschaft fur Gasetechnik Lotz KG, Wallau, Germany**

**Filed Apr. 7, 1972, Ser. No. 241,923**

**Claims priority, application Germany, Apr. 7, 1971, P 21 16 911.9**

**Int. Cl. B23k 7/02**

**U.S. Cl. 266—23 R** **9 Claims**



In a device for supporting a horizontally positioned strand in a continuous casting plant as it is flame-cut, a pair of supporting rolls is located in the region through which the strand passes as it is severed by a flame cutter. Each of the rolls can be pivoted between a support position disposed below the strand and another position spaced laterally from the strand. The rolls are interconnected so that their axles are disposed at right angles to one another. Due to their interconnection, as one roll is moved into the support position the other roll is moved out of the support position into another position. The supports for each roll can be located on the same side or on opposite sides of the strand.

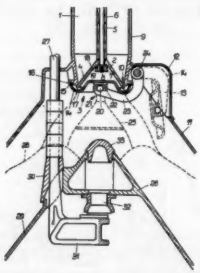
### 3,788,621
### CHARGING HEAD FOR A METALLURGICAL FURNACE

**Pieter Nieboer, Kapellen, Germany, assignor to Demag Aktiengesellschaft, Duisburg, Germany**

**Continuation of Ser. No. 32,921, April 29, 1970, abandoned. This application July 10, 1972, Ser. No. 270,482**

**Int. Cl. C21b 7/18**

**U.S. Cl. 266—27** **7 Claims**



A charging head for a metallurgical furnace includes a hopper which is connected into a furnace head and terminates in an interior annular sealing seat which is closed by a small bell which is carried on a pull rod which extends through the hopper. A throat cover for the furnace particularly for shaft furnaces which are operable at high pressures, such as a pressure blast furnace; and with a hopper which is closeable from the atmosphere after it is charged with material intermittently; includes a sealing valve which is pivotable from an open position at which it lies in a bulging portion of the furnace head into a closed position in which the valve extends around the lower portion of the small bell and seals the lower end of the hopper. The valve includes an annular sealing lip which engages into a seat defined on the exterior of the hopper around the exterior of the bell and engages with the seat at a location above the sealing seat defined at the interior of the hopper and which is engaged by the small bell. The small bell dams the material at the outlet of the hopper and a lower larger bell provides a distribution for the material and is located within the furnace below the small bell. The valve provides a hermetic seal around the exterior of the small bell and separates the storage bunker from the furnace zone when it is closed.

### 3,788,622
### FURNACE

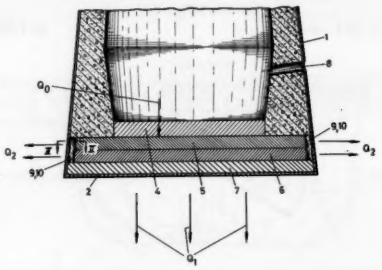
**Jacobus van Laar, Santpoort, and Jacob Felthuis, Oudorp, both of Netherlands, assignors to Hoogovons Ijmuiden B.V., Ijmuiden, Netherlands**

**Filed Nov. 30, 1972, Ser. No. 310,719**

**Claims priority, application Germany, Dec. 1, 1971, P 21 59 667.8**

**Int. Cl. F27b 1/24**

**U.S. Cl. 266—32** **8 Claims**



A furnace provided with a wall and a refractory inner masonry structure, between which there is a space, there being compressible elements from a material of high heat conductivity arranged in contact with the walls of said space, for improving heat discharge from the interior of the furnace. The said space may be filled with a ramming mix or tamping mixture. The elements are preferably copper pipes. For many furnaces and applications said space will be annular around the furnace and the elements are provided at regular intervals and compressible in a radial direction with respect to the furnace.

### 3,788,623
### VERTICAL MELTING FURNACE

**Ralph A. Vogel, Box 283 R.R. 5, Three Rivers, Mich.**

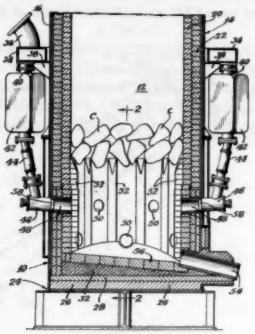
**Filed Oct. 18, 1971, Ser. No. 190,061**

**Int. Cl. F27b 1/14**

**U.S. Cl. 266—33 R** **9 Claims**

A vertical furnace for melting metal pieces, such as pieces of copper cathode. The furnace has a wall of refractory brick material which encloses an upright melting chamber having a plurality of burner openings through the inner surface of the wall, heat being injected through the openings to melt the metal pieces. An outlet drains the molten metal from the bottom of the chamber. A plurality of upright brick sections are constructed unitary with the wall and project inwardly from the wall. The upright sections are located on opposite sides of each burner opening so as to maintain the metal pieces in spaced relationship from the burner openings and thereby prevent blockage thereof. The bottom of the furnace has a

reverse arch shape and is also formed of refractory brick material. The reverse arch shape assists in maintaining the brick pieces, forming the bottom, in the desired set condition. Channels are provided in the wall and communicate between



the burner openings and the burners, which are spaced outwardly of the burner openings at a slight angle so that any molten metal entering the channel will drain therefrom simply by action of gravity.

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**3,788,624**

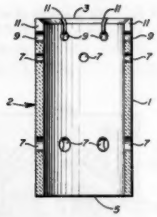
**IMMERSION BELL**

**Timothy W. Miller, Coopersburg, Pa., assignor to Bethlehem Steel Corporation, Bethlehem, Pa.**

**Filed June 21, 1972, Ser. No. 265,026**

**Int. Cl. C21c 7/00**

**U.S. Cl. 266—34 T** **13 Claims**



An apparatus for introducing reagents beneath the surface of molten metal comprising a tubular member which is detachably fastened to a closure member. Expansion spaces are provided between the sidewalls of the tubular member and the closure member minimizing thermal stress in the sidewalls.

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**3,788,625**

**ROTARY CUTTER**

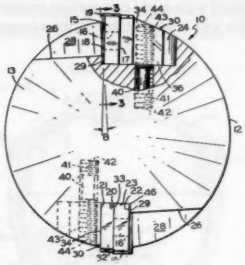
**Harold W. Lindsay, 2480 N.W. Vaughn, Portland, Oreg.**

**Filed Apr. 3, 1972, Ser. No. 240,697**

**Int. Cl. B26d 1/26**

**U.S. Cl. 29—105 A** **2 Claims**

A rotary cutter for pin type carbide inserts includes peripheral, radially extending recesses in which the inserts are received. A shim is positioned in each recess adjacent the back face of the insert, the insert being retained on an integral pin on the front face of the shim and by a lip formed by a chip clearance cutout at the front of the recess. A keying lug on the back face of the shim is received in a keyway in the recess and includes a screw threadedly receivable in the cutter body, the



screw serving to clamp the shim and the insert in the recess with the cutting face of the insert engaged by the lip.

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**3,788,626**

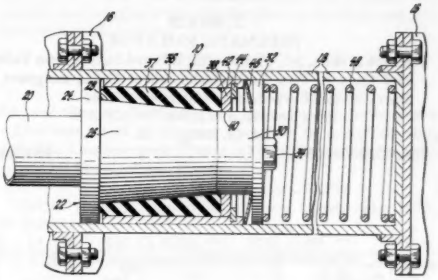
**DAMPENED SHOCK ABSORBING BUMPER**

**Manfred A. Isaacson, Pontiac, Mich., assignor to General Motors Corporation, Detroit, Mich.**

**Filed Dec. 26, 1972, Ser. No. 318,367**

**Int. Cl. F16f 7/08**

**U.S. Cl. 267—9 C** **2 Claims**



An impact energy absorbing device includes a cylinder having a cylindrical friction shoe slidable therein. A ram is slidably guided in the cylinder and has a ramped cylindrical surface spaced radially from the friction shoe. An annular member of substantially incompressible elastomeric material fills the radial space between the ram and the friction shoe and is axially confined between the ram and friction shoe. A Belleville spring carried by the ram exerts an axially compressing preload force on the annular member whereby the ramped cylindrical surface of the ram radially cams the annular member against the friction shoe to preload the friction shoe against the tubular member so that upon telescoping movement of the ram into the tubular member upon impact, the friction shoe is self-energized against the tubular member.

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**3,788,627**

**HYDRAULIC RESERVOIR**

**Walter Wieland, am Roten, Kreuz, Germany, assignor to Langen & Company, Dusseldorf, Germany**

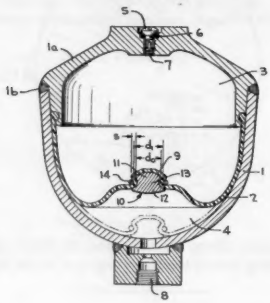
**Filed Aug. 1, 1972, Ser. No. 277,128**

**Int. Cl. F16f 3/07**

**U.S. Cl. 267—64 R** **13 Claims**

A hydraulic reservoir finding particular application as a pressure reservoir for hydro-pneumatic resilient suspensions

for vehicles in which the interior of a casing constituting the reservoir is divided by a movable deflectable separating wall or partition into a gas chamber and a liquid chamber, the casing being provided with a gas connection communicating with the gas chamber and a liquid connection communicating with



the liquid chamber for supplying and removing gas and liquid into or from the respective chambers and the separating wall or partition being provided with a cover member removably connected thereto which serves to prevent the wall or partition sliding or moving into the liquid connection when the liquid chamber is empty.

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**3,788,628**

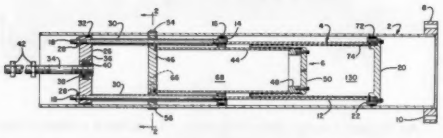
**PNEUMATIC ISOLATOR**

**Kenneth J. Hotz, Jr., Chatsworth; Edward Steiner, Sun Valley, and Gary L. Fox, Los Angeles, all of Calif., assignors to Barry Wright Corporation, Watertown, Mass.**

**Filed Nov. 10, 1972, Ser. No. 305,373**

**Int. Cl. B60g** *11/26*

**U.S. Cl. 267—65 R** **15 Claims**



A pneumatic spring device of the type embodying a rolling sleeve seal comprising improved means for clamping and hermetically sealing the ends of the seal to two members that are capable of displacement relative to one another. Each clamping means comprises a pair of cooperating sealing members that engage opposite sides of an end of the seal and have unique rib-groove configurations that produce a strong gripping action without damaging the seal or so distorting it as to increase its likelihood of failure under continuous and changing loads.

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**3,788,629**

**VEHICLE TRACTION BAR**

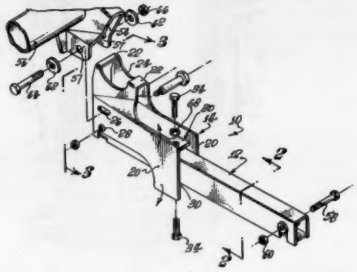
**Robert E. Johnson, Los Angeles, Calif., assignor to Whittaker Corporation, Los Angeles, Calif.**

**Filed Aug. 21, 1972, Ser. No. 282,438**

**Int. Cl. B60g** *25/60*

**U.S. Cl. 267—66** **13 Claims**

A traction bar for use in stiffening the rear suspension systems of vehicles which utilize coil springs as part of their suspension system with a pair of traction bars being used in place of the lower control arms. Each traction bar comprises a rigid, elongated control arm and a frame member, with the control arm pivotally connected at its normally rearward end to the frame member. The latter is fixedly connected to a vehicle's rear axle housing while the control arm extends forwardly of the frame for pivotal connection at its forward end



to a forward, lower control arm bracket. The frame is provided with vertically oriented adjusting bolts for engagement with the control arm intermediate the ends of the latter. For vehicle race use, the adjusting bolts are locked against the control arm to prevent it from moving vertically relative to the frame and, for vehicle street use, the adjusting belts are backed off from contact with the control arm to permit vertical movement of the latter with respect to the frame.

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**3,788,630**

**PNEUMATIC SUSPENSION UNIT**

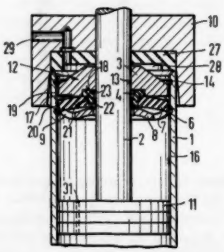
**Manfred Koller, Schweinfurt am Main, Germany, assignor to Fichtel & Sachs AG, Schweinfurt am Main, Germany**

**Filed Apr. 12, 1971, Ser. No. 133,200**

**Claims priority, application Germany, Apr. 29, 1970, P 20 20 964.7**

**Int. Cl. F16f** *9/36*

**U.S. Cl. 267—65 R** **9 Claims**



In a pneumatic suspension unit of the piston-and-cylinder type, the piston rod is guided into and out of the cylinder cavity by an annular guide member arranged in one axial end portion of the cavity. The outer circumference of the guide member defines a gap with the inner cylinder wall. A resilient sealing element having two radially extending faces is held in axial engagement of one face thereof with a corresponding face of the guide member by an annular backing member which engages the other face of the sealing element. Radially and axially open recesses in the backing member permit resilient deformation of the sealing element out of the normal relaxed position in which the sealing element engages the piston rod with its inner circumference and the inner cylinder

wall with its entire outer circumference. Fluid forced into the gap between the guide member and the cylinder wall under sufficient pressure deflects portions of the sealing element into the recesses of the backing member so that fluid may enter the cylinder cavity.

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3,788,631

## SPIRAL SPRINGS AND METHODS OF MAKING THEM

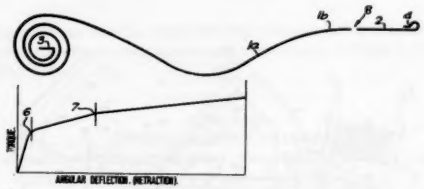
Douglas Eric William Aldous, London, England, assignor to Tensator Limited, London, England

Filed June 16, 1972, Ser. No. 263,451

Claims priority, application Great Britain, Aug. 25, 1971, 39977/71

Int. Cl. F16f *1/10*

U.S. Cl. 267—156 9 Claims




A method of making a spiral spring from a strip of spring material comprises the steps of forming an end portion of the strip of spring material so that the end portion is set to form a spiral coil and the remainder of the strip is substantially straight or is set to coil spirally around the said coiled end portion with a radius of curvature substantially greater than that of the coiled end portion, and then backwinding at least the said coiled end portion.

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3,788,632

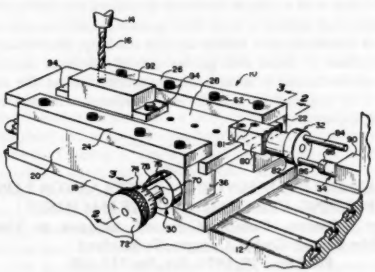
## WORK-POSITIONING TABLE

George N. Lukas, 5009 N. Sheridan Rd., Chicago, Ill.

Filed Sept. 1, 1971, Ser. No. 177,054

Int. Cl. B23q *3/02*; B25b *1/18*

U.S. Cl. 269—20 15 Claims



A work-positioning table for positioning a work piece relative to a tool to perform an operation on a selected portion of the work piece. The table includes a base. A work carrier is movably mounted on the base. A holder is mounted on the base and is engageable with the work carrier. A fluid-operated cylinder having a ram connected thereto is engageable with the work carrier to force the work carrier into frictional holding engagement with the holder for holding the work carrier in any selected position.

3,788,633

## ADJUSTABLE ANGLE PLATE ARRANGEMENT

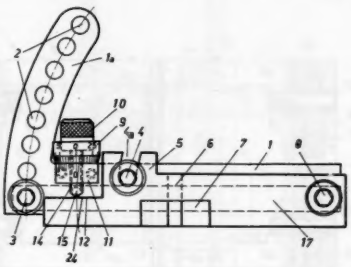
Antonio Cho, 8048 Feldblumenstr. 127, Zurich, Switzerland

Filed Aug. 25, 1969, Ser. No. 852,532

Claims priority, application Switzerland, Aug. 30, 1968, 13116/68

Int. Cl. B23q *3/04*

U.S. Cl. 269—60 10 Claims



A work supporting plate for a machine tool is pivotally mounted between two normally fixed base arms and two swinging arms, the plate and arms being connected by a common pivot. A segment on each swinging arm has a row of uniformly spaced bores in an arc about the pivot axis for coarse adjustment of the angular plate portion in integral multiples of 1°, and a threaded abutment on each swinging arm permits the swinging arms with the plate to be finely adjusted relative to the base arms.

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3,788,634

## SHEET POSITIONING APPARATUS

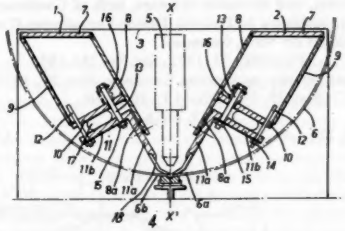
Edmond Chauvet, Parthenay, and Andre Prevote, Malvaut Par Cherveux, both of France, assignors to L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude, Paris, France

Filed Sept. 22, 1972, Ser. No. 291,374

Claims priority, application France, Sept. 24, 1971, 71.34506

Int. Cl. B25b *1/00*; B23c *19/00*

U.S. Cl. 269—154 6 Claims

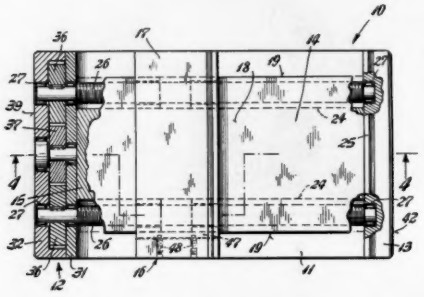


This invention relates to apparatus for positioning sheet material which is to be welded together edge to edge and of the type in which these edges are held in the welding position by means of movable jaws arranged longitudinally and being brought by drive means into a clamping position with respect to said edges against a fixed longitudinal girder. The invention provides that the movable jaws are arranged of either side and above the fixed girder forming a lower support and these jaws are also firmly fixed to jaw carriers mounted with transverse guides on one or the other of two upper longitudinal support girders. These guides converge substantially towards the line of weld and drive means are arranged between each jaw carrier and the associated upper support girder.

## 3,788,635
## MACHINE TOOL VISE

**Leonard Nelson, Trumbull, Conn., assignor to Custom Tool & Machine Co. Inc., Bridgeport, Conn.**

**Filed Apr. 12, 1972, Ser. No. 243,306**
**Int. Cl. B25b** *1/10*
**U.S. Cl. 269—244** **1 Claim**

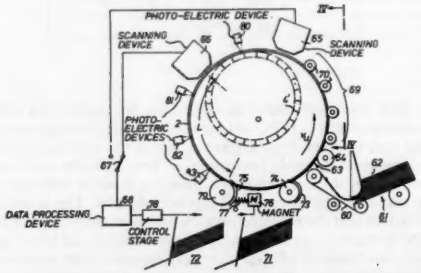


A machine tool vise having a base with five squared sides including a planar bottom adapted to be releasably mounted on a worktable of a machine tool and the like and having the same overall length regardless of the extent to which the fixed and movable jaws are separated, the movable jaw being slidably mounted on a wide rail secured to end blocks in which a plurality of laterally spaced feed screws are mounted for rotation in thrust-absorbing means, the feed screws being located beneath said wide rail, each feed screw having a gear fixed thereto and a driving gear located between and meshing with said gears to cause the screws to rotate in unison, said driving gear having a socket to removably receive a wrench or the like for rotating said gears and said feed screws to cause the latter to open or close the jaws, the wide rail being located in a horizontal plane above that of the feed screw and serves as a horizontal support for a workpiece placed between the fixed and movable jaws.

## 3,788,636
## ROTATING SUCTION DRUM FOR DATA CARRIERS

**Karl Rehm, and Hermann Schwarz, both of Constance, Germany, assignors to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt am Main, Germany**

**Filed May 23, 1972, Ser. No. 256,150**
**Claims priority, application Germany, May 29, 1971, P 21 26 833.7; May 29, 1971, HGM 71 20 974.0**
**Int. Cl. B65h** *5/12*
**U.S. Cl. 271—4** **11 Claims**

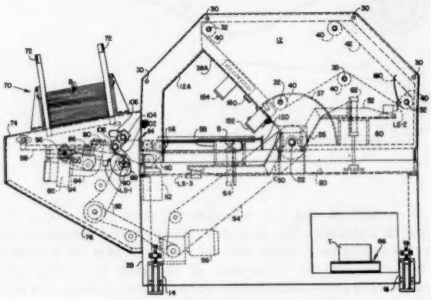



A rotating suction drum passes sheet-type data carriers past at least one scanning device. The drum has an open frontal side and a zone with a plurality of channels leading to individual suction openings on the drum. A suction generator has a fan and is so disposed with respect to the drum that the entry opening for the fan passes through the open frontal side. The ratio between the sum of the areas of minimum cross section of the channels and the total area of the zone of the drum covered by the suction openings is more than 0.25.

## 3,788,637
## BLANK INSERT MECHANISM FOR TRAY FORMING APPARATUS

**Horst G. Lattke, Middletown, Conn., assignor to Emhart Corporation, Bloomfield, Conn.**

**Division of Ser. No. 55,643, July 17, 1970, Pat. No. 3,683,755. This application May 15, 1972, Ser. No. 253,448**
**Int. Cl. B65h** *9/14*
**U.S. Cl. 271—13** **1 Claim**



Precut and prescored tray blanks are stacked in a magazine, and pivoted vacuum cup means is adapted to withdraw the lowermost blank from the stack by moving the blank downwardly to a delivery position. Control means is provided for operation of the vacuum cup to move it from and to its pick-up position in engagement with the lowermost blank in the stack, the vacuum cup being vented to atmosphere when it reaches the delivery position. A continuously driven roller is adapted to receive the leading edge of the blank in this delivery position and a back-up roller swings on the axis of the driven roller so as to pinch the blank therebetween and to feed it downstream against a stop. Side guides loosely receive the edges of the blank as it moves against the stop, and inturned end portions of these side guides actually deform the side edges of the blank to hold it into position against the stop where it is engaged by mechanism associated with the tray forming apparatus.

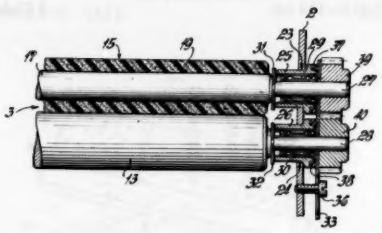
## 3,788,638
## ROLLER ARRANGEMENT, IN PARTICULAR FOR PAPER FOLDING, CREASING AND LIKE MACHINES

**Werner Lehmann, Gutach, Germany, assignor to Firma Mathias Bauerle GmbH, Georgen, Switzerland**

**Filed Dec. 29, 1971, Ser. No. 213,649**
**Claims priority, application Germany, Jan. 29, 1971, 2104166**
**Int. Cl. B65g** *47/00*
**U.S. Cl. 271—51** **2 Claims**

The present invention concerns a roller arrangement, in particular for use in connection with paper treating machines and more specifically with paper folding, creasing and like machines, in which one or several pairs of rollers are employed and operated for conveying and/or folding a pile of sheets of paper or other cellulosic materials having different thicknesses with respect to each other and arranged parallel in axial direction to each other. Such sheets of material are

operatively connected and subjected to common drive means, each pair of feed and sheet conveyor rollers including at least one hard surfaced or steel roller and a further roller for



cooperation with the latter carrying a shell or jacket of friction material surrounding its core and presenting a rubbing or friction surface.

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**3,788,639**

**SHEET FEEDING CYLINDER**

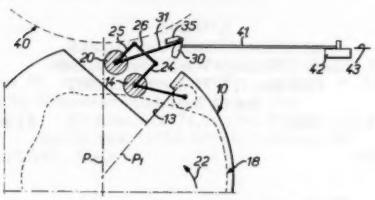
**Michel Bru, Chatenay-Malabry, France, assignor to Ets J. J. Carnaud & Forges de Basse-Indre, Boulogne, France**

**Filed Mar. 20, 1972, Ser. No. 236,275**

**Claims priority, application France, Mar. 29, 1971, 7110876**

**Int. Cl. B65h** *5/12*

**U.S. Cl. 271—53** **10 Claims**



A cylinder for feeding sheets of tinplate to a machine for treating at least one of the faces of the sheets by printing, varnishing or coating. A longitudinal cavity extends into the cylinder from the periphery parallel to the axis thereof. A shaft is located in the cavity and mounted for rocking movement about its axis by control means located beyond one end of the cylinder. A stop and a gripper operable by the rocking of the shaft and arranged to cooperate with the leading edge of a sheet for feeding it. The stop and the gripper are secured to an auxiliary shaft parallel to the first shaft and mounted for rocking movement in said cavity in which it is wholly contained, the two shafts being connected to each other for rocking movement by a transmission linkage comprising a first lever secured to the first shaft and a second lever shorter than the first secured to the auxiliary shaft and a connecting rod pivotally connected to the levers.

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**3,788,640**

**MOVING BIN SORTING APPARATUS**

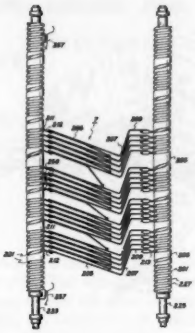
**Denis J. Stemmle, Williamson, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Dec. 29, 1972, Ser. No. 319,957**

**Int. Cl. B65h** *31/24*

**U.S. Cl. 271—64** **6 Claims**

This invention relates to a sorting apparatus for receiving sheets from a copying machine. A plurality of tray members receive the sheets as the tray members move past a sheet discharge zone. The drive rotates cam members to move the tray members vertically as sheets are moved along the sheet path towards the tray members. The cam members are formed



with variable pitch camming surfaces such that the tray members are in close proximity to each other except when positioned adjacent to the sheet discharge zone, whereupon the camming surfaces affect a spreading movement of the trays upon passing the sheet discharge zone.

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**3,788,641**

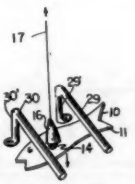
**MANIPULATION GAME**

**Jerome H. Lemelson, 85 Rector St., Metuchen, N.J.**

**Filed Jan. 26, 1973, Ser. No. 326,679**

**Int. Cl. A63f** *9/00*

**U.S. Cl. 273—1 M** **5 Claims**



A game is provided which requires the skill of the player to manipulate a first member such as a simulated hook or grapple into engagement with a second member such as a fish whereby the two are retained together by releasable fastener and to thereafter manipulate the second member by the skill of manipulation of the first member upwardly through adjacent narrow, elongated formations such as spaced parallel bars which, if the second member is not properly aligned with said formations, said formations may cause the two members to become separated and the second member to drop away from the first member. Attraction and retention of the second member to the first member is effected by magnetic means, releasable hooking material or adhesive means.

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**3,788,642**

**BASKETBALL BACKBOARD AND GOAL STRUCTURE**

**Earl L. Matras; Frank D. Matras, and Donald J. Herad, all of Milwaukee, Wis., assignors to Frabill Manufacturing Co., Milwaukee, Wis.**

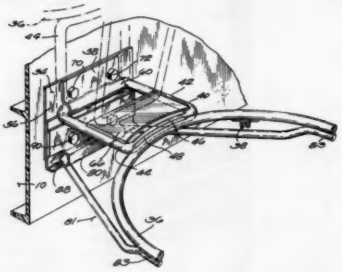
**Filed May 18, 1972, Ser. No. 254,364**

**Int. Cl. A63b** *63/04*

**U.S. Cl. 273—1.5 R** **7 Claims**

A pre-mounted fold-up basketball backboard and goal structure includes a molded fiber glass backboard with a net-

work of reinforcing ribs on the rear surface of the backboard to strengthen the backboard and eliminate dead spots. The goal structure includes a hoop or rim with a support frame fixedly connected to the hoop and hinged to a base plate assembly which is secured to the backboard. The hinged con-



nection of the hoop with the base plate assembly enables the hoop to be folded parallel to the backboard for shipment of the assembled hoop and backboard in a thin container. When erected for use, reinforcing rods extending from the hoop are secured to the base plate assembly by a clamping plate.

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**3,788,643**

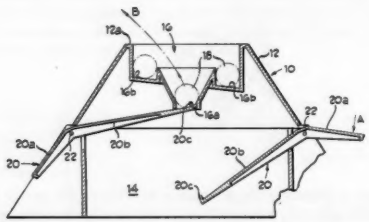
**MISSILE ACTUATED TARGET LEVER**

**Howard J. Morrison, Highland Park, and Donald Frederick Nix, Des Plaines, both of Ill., assignors to Marvin Glass & Associates, Chicago, Ill.**

**Filed Dec. 8, 1971, Ser. No. 205,837**

**Int. Cl. A63b** *71/00*

**U.S. Cl. 273—102.1 G** **20 Claims**



A target type game apparatus which includes a generally hollow frame member which has a generally centrally disposed open-top receptacle for receiving a plurality of balls, or the like. The receptacle has a central launching position defined by a hole in the bottom wall of the receptacle. The hole opens to the interior of the frame member and has a smaller diameter than the diameter of any one of the balls so that a ball may seat in the hole in a launching position. A ramp-like chute feeds the balls one-at-a-time to the hole in launching position. A plurality of lever members are pivoted intermediate their ends to the sides of the frame member about the central receptacle. One end of each lever member is exposed exteriorly of the frame member and defines a target area for striking by an object, e.g., throwing a bean bag at the target area. The opposite end of each lever member is disposed within the hollow frame member and defines a trigger adapted to strike the underside of a ball positioned in the launching hole and propel the ball from the receptacle generally in the direction which the respective target area faces, in response to the target area being struck by an object.

**3,788,644**

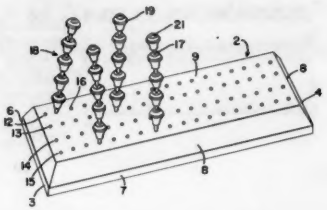
**MATHEMATICAL BOARD GAME APPARATUS**

**Brent R. Evans, 1660 Calado Ct., Campbell, Calif.**

**Filed Nov. 10, 1971, Ser. No. 197,216**

**Int. Cl. A63f** *3/00*

**U.S. Cl. 273—134 AD** **8 Claims**



Apparatus for playing a mathematical game including an elongated block having at least four rows of 18 apertures each adapted to receive the stem of a mover, of which there are 20, and a plurality of dice adapted to be manipulated by each player in turn to determine the number of apertures encompassed within each move. Each mover is provided with a bore correlated in depth and diameter to the shank of another mover so that when the shank of a mover extends fully thereinto the mover lies somewhat tilted within the supporting bore. The game is designed to provide an adequate experiential base (involving choices, physical actions, and consequences) to promote, over a period of time, success in developing mathematical abilities.

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**3,788,645**

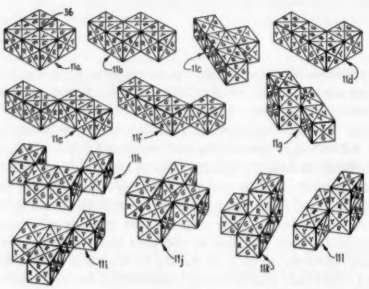
**MATHEMATICAL CUBE PUZZLE**

**Scott N. Nelson, 4259 Emory Way, Livermore, Calif.**

**Filed June 1, 1972, Ser. No. 258,872**

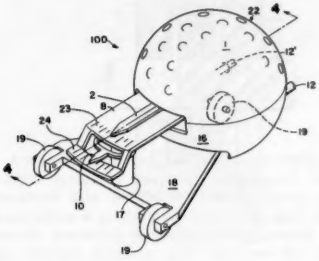
**Int. Cl. A63f** *9/08*

**U.S. Cl. 273—156** **5 Claims**



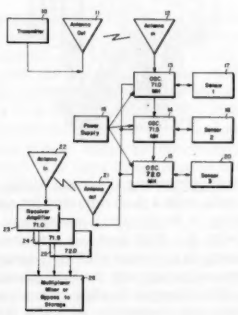
A puzzle made up of four separate cubes which are arrangeable into a plurality of differing solutions is described. Each edge of each cube has one of a set of three colors associated therewith, and the resulting arrangement or combination of colors around the edges on each cube face is different from that on every other cube face, and the colors of all common edges of adjacent faces on each individual cube match one another. The object of the puzzle is to arrange the various cubes relative to one another so that the colors associated with all exposed adjacent playing edges of different cubes match one another, e.g., are the same. Various solutions of differing degrees of difficulty are described satisfying this criteria.

3,788,646
**PUTTING STROKE ANALYSER**
Robert E. Rawson, 9521 Harriet Ln., Anahein, Calif.
Filed July 21, 1972, Ser. No. 251,514
Int. Cl. A63b 69/36
U.S. Cl. 273—183 C 13 Claims



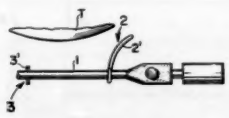
An analytical putting improvement instrument of the struck or missile type having graphical outputs showing direction and degree of putter-face misalignment when a putter is addressed to the instrument prior to and after stroking, and showing direction and degree of putting-stroke misalignment when a putter strokes the instrument; flexible connection of sensing elements and wheeled carriage provisions prevent impact damage to the mechanism; putting stroke and putter face misalignment register until reset.

3,788,647
**SWING MEASUREMENT SYSTEM**
James W. Evans, Jacksonville, Fla., assignor to Athletic Swing Measurement, Inc., Clearwater, Fla.
Filed Dec. 6, 1971, Ser. No. 205,067
Int. Cl. A63b 69/36; G01s 9/56; H01q 1/00
U.S. Cl. 273—186 A 9 Claims



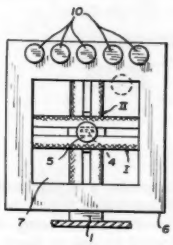
A swing measurement system for measuring characteristics of the swing of an athlete's arm, bat, club or for orthopedic and medical measurements of the movement of an individual's limbs. A transmitter is utilized for transmitting predetermined frequency to a passive repeater circuit where the received frequency is modulated with signals generated by sensors such as an accelerometer or strain gauge and the modulated frequency retransmitted by the passive repeater to a receiver where it can be displayed for comparison and analysis.

3,788,648
**LOCKING DEVICE FOR TONE ARMS**
Kiyoshi Kawai, Tokyo, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan
Filed Dec. 16, 1971, Ser. No. 208,864
Claims priority, application Japan, Dec. 17, 1970, 45/126317
Int. Cl. G11b 3/10
U.S. Cl. 274—23 B 2 Claims



A locking device for a tone arm comprising a tone arm lifter and a tone arm rest. The arm lifter is arranged so that the outer end portion of the lift plate is formed with a curved hook-like portion, the outer end of which is bent inwardly. The seating plate of the arm rest is provided with a rising curved portion, at least in its inner side part. The hook-like portion of the arm lifter and the rising portion of the arm rest form an aperture having a restricted opening between the outer end of the hook-like portion and the top of the rising portion, wherein the tone arm is captively located and clamped when the arm is out-of-use.

3,788,649
**ONE-POINT-BALANCE ADJUSTING DEVICE**
Takeshi Hirano, Iwaki, Japan, assignor to Alps Motorola Inc., Tokyo, Japan
Filed Aug. 9, 1972, Ser. No. 278,962
Int. Cl. G11b
U.S. Cl. 274—1 R 4 Claims

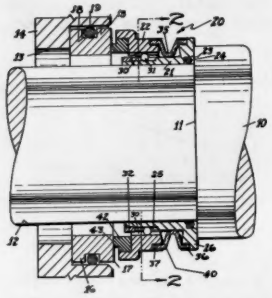


A balance adjusting device for a four-channel stereo system comprises a pair of linear potentiometers mounted one above the other at right angles to one another. The lower potentiometer has its control shaft connected to the bottom of the upper potentiometer which is movable relative to the lower potentiometer. The physical location of the knob on the control shaft of the upper potentiometer is used as an indication of the balance of the sound field of the system.

3,788,650
**ROTARY SEAL**
Bruce S. Place, Warwick, R.I., assignor to Magnetic Seal Corp., West Barrington, R.I.
Filed Oct. 4, 1971, Ser. No. 185,935
Int. Cl. F16j 9/00
U.S. Cl. 277—38 2 Claims

A rotary seal is provided which will operate to maintain a seal between relative rotating parts when there is substantial

axial movement between the parts by providing a pair of annular members telescopically disposed which will telescope on



axial relative movement of the parts. Flexible sealing is provided between the two telescoping parts to maintain a fluid tight arrangement.

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**3,788,651**

**INFLATABLE SEALS**

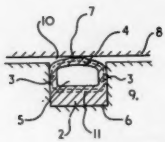
**William David Brown, Ashfordby, and Richard Noel Thomson, Markfield, both of England, assignors to Dunlop Limited, London, England**

**Filed Dec. 20, 1972, Ser. No. 317,081**

**Claims priority, application Great Britain, Dec. 23, 1971, 59897/71**

**Int. Cl. F16j** *15/46*

**U.S. Cl. 277—34** **8 Claims**



An inflatable seal comprising a flexible wall portion and an inflatable chamber defined at least in part by the flexible wall portion, the flexible wall portion being formed from a synthetic rubber reinforced by one or more layers of fabric reinforcement formed from an aromatic polyamide, an aromatic polyimide, or an aromatic polyamide-imide. The seals made according to the present invention are particularly suited for application in which they are exposed to extreme conditions, for example steam at high pressure. Such applications includes autoclaves, and sterilising units, of which the following is a Specification.

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**3,788,652**

**SEALING DEVICES FOR ROTATING SHAFTS**

**Alfred Georges Jean Hirtz, Boulogne-Sur-Seine, and Christian Andre Lucien Mech, L'Isle-Adam, both of France, assignors to Societe Rateau, Paris, France**

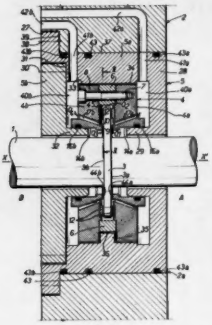
**Filed Nov. 22, 1971, Ser. No. 200,983**

**Claims priority, application France, June 3, 1971, 7120105**

**Int. Cl. F16j** *15/16*

**U.S. Cl. 277—71** **11 Claims**

A device for sealing an opening in a wall for the passage of a rotating shaft, comprising means for interposing a barrier of pressurized liquid between the two spaces separated by the wall. These means include an annular block sealingly mounted in the opening, astride a flange fast with the shaft, and provided, opposite each side of said flange, with a series of



hydrodynamic lift generating shoes, and a frontal surface which determines a barrier-liquid leakage limiting clearance, whereby the shoes automatically balance the clearances on either side of the flange.

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**3,788,653**

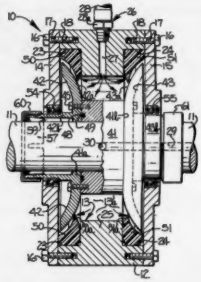
**ROTARY FLUID SEAL**

**James W. Sigmon, Charlotte, N.C., assignor to Sigmon Corporation, Charlotte, N.C.**

**Filed Sept. 18, 1972, Ser. No. 289,798**

**Int. Cl. F16j** *15/38, 15/40*

**U.S. Cl. 277—70** **11 Claims**



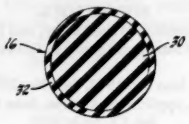
A rotary fluid seal comprising a housing having a fluid pressure chamber therein, with a shaft mounted for rotation in the housing and having a longitudinal passageway therein for communicating with the fluid pressure chamber within the housing. The housing is provided with port means extending therethrough communicating with the fluid pressure chamber for introducing a fluid therein. Sealing means are positioned within the housing and cooperate with the fluid pressure chamber therein for controlling the flow of fluid from within the fluid pressure chamber into the longitudinal passageway of the shaft without escapement from around the shaft. The sealing means comprises a rotatable member of rigid construction, concentrically carried by, and rotatable with the shaft and having an axial face serving to define a wall portion of the fluid pressure chamber, and a seal member carried by the housing and having a flexible annular lip portion sealingly engaging the axial face of the rotatable member concentrically therewith, and also serving to define a wall portion of the fluid pressure chamber.

3,788,654

## MULTIPLE HARDNESS O-RINGS

Donald J. Mandley, Washington, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Sept. 30, 1971, Ser. No. 185,287
Int. Cl. F16j 9/00
U.S. Cl. 277—229 2 Claims




A multiple hardness O-ring wherein a molded ring of nitrile rubber including partially unactivated materials has a hardened skin formed by surface curing the unactivated materials in a solution of the curing agent for nitrile rubber thereby providing secondary curing period which increases the exterior hardness and improves the compression set characteristics of the O-ring.

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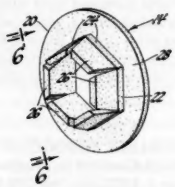
3,788,655

## GROMMET SEALING ARRANGEMENT

John G. Hathaway, St. Clair Shores, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed July 10, 1972, Ser. No. 270,455
Int. Cl. F16l 5/02; H01b 17/30; B23p 11/02
U.S. Cl. 277—212 F 3 Claims



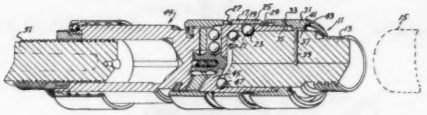

An arrangement for sealing an apertured panel through which a member is inserted utilizes a grommet of a generally flexible material. An annular edge of the panel defines the aperture and the member has an annular outer surface received in spaced relationship to the annular edge of the panel after it is inserted through the circular aperture. The grommet is inserted within the aperture prior to the member and includes a head flange portion integral with sealing and guide portions. The head flange portion has a generally annular configuration with a surface engaging one side of the panel adjacent the annular edge of the circular aperture. The sealing portion is received within the aperture and has a cross section with a thin-walled equilateral polygonal configuration. The totals of the lengths of the inner and outer sides of the sealing portion are respectively substantially equal to the circumferences of the annular outer surface of the member and the annular edge of the panel. Consequently, the junctures of the sides of the sealing portion grip the annular edge of the panel to initially position the grommet, and the sealing portion deforms during insertion of the member to assume an annular configuration sealing against both the member and the panel. The guide portions of the grommet normally extend from the respective sides of the sealing portion with a generally frustoconical configuration pointed away from the head flange portion so as to guide the grommet during insertion within the circular aperture of the panel. The guide portions expand to a split annular configuration during the insertion of the member.

3,788,656

## RADIO ACTIVE TOOL HOLDER

Theodore M. Smith, Detroit, Mich., assignor to Lucille G. Smith and Theodore M. Smith, Trustees of the Theodore M. Smith Trust, Detroit, Mich.

Filed Feb. 14, 1972, Ser. No. 225,769
Int. Cl. B23b 31/04
U.S. Cl. 279—1 A 6 Claims



In a radio active tool holder which includes a power rotated and longitudinally fed shank normally projected into a cylindrical body adapted to mount a tool holder and wherein a series of radial slots are provided in said shank adapted to receive drive balls carried by said body and wherein the radio active ring is mounted upon said body and normally exposed with respect to a longitudinally movable shield on said body and wherein a series of pin and guide slot means are provided between the shield and shank permitting the shield to rotate with the shank and move longitudinally thereof and wherein a pin and slot connection between the shield and body includes angular slot in the body whereby relative rotation of the shank with respect to the body effects longitudinal movement of said shield so as to protectively enclose the radio active ring.

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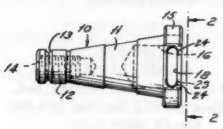
3,788,657

## TOOL HOLDER FOR USE WITH AUTOMATIC TOOL CHANGING APPARATUS

Robert S. Sutton, Franklin, Mich., assignor to Ex-Cell-O Corporation, Detroit, Mich.

Filed Aug. 30, 1972, Ser. No. 284,812
Int. Cl. B23b 31/36
U.S. Cl. 279—1 TS 7 Claims



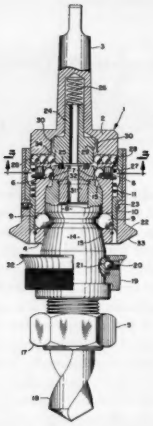

A tool holder for use with a machine tool having a rotatable spindle and an automatic tool changing apparatus for positioning the tool holder in alignment with the spindle and for engagement therewith for performing a work operation on a workpiece by a tool carried in the tool holder. The tool holder includes a holder body having a shank adapted to be received in the drive spindle of a machine tool, and a radially outward extended peripheral flange. The flange is provided with a pair of elongated, radially inward extended pockets which are identically shaped and disposed on opposite sides of the flange. The elongated pockets are adapted to operatively receive complementary shaped fingers of the tool gripping mechanism of an automatic tool changer apparatus. A pair of inserts having selectively spaced apart bores are adapted to be mounted in the elongated pockets to permit locating and securing the tool holder in a predetermined orientation in the tool gripping mechanism of the automatic tool changing apparatus.

3,788,658

## INSTANT CHANGE TOOL HOLDER

Milton L. Benjamin; David D. Walker, and Wilbur N. Miles, all of Chagrin Falls, Ohio, assignors to Erickson Tool Company, Solon, Ohio

Filed Aug. 14, 1972, Ser. No. 280,650
Int. Cl. B23b 31/06
U.S. Cl. 279—75 7 Claims



A tool holder characterized in that the drive housing socket and the tool adaptor shank driven thereby have a quick release connection with each other, and have sleeves rotatable thereon to facilitate the connection and disconnection of the adaptor and housing without stopping rotation of the machine tool spindle in which the drive housing is adapted to be mounted. The housing sleeve is axially movable on the housing between locking and unlocking positions and the housing has a latch mechanism which holds the housing sleeve in unlocking position, the latch mechanism being operative during axial insertion of the adaptor shank into the housing socket to initiate rotation of the shank for facilitating the making of an axially interfitted driving connection between the housing and shank and to automatically release the housing sleeve for movement to adaptor locking position.

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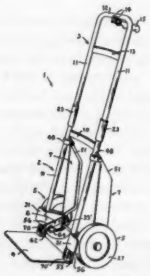
3,788,659

## HAND TRUCK

Benigene Allen, 3291 Oakwood St., Portage, Ind.

Filed June 5, 1972, Ser. No. 259,585
Int. Cl. B62b 5/02
U.S. Cl. 280—5.24 12 Claims



The structure is directed to a manually operable truck comprising a pair of wheel units, a lower forwardly extending load-bearing platform, an upright load-bearing framework provided with a handle whereby to facilitate manipulation of the truck; and the invention primarily involves providing means whereby the aforesaid components may be adjusted for operational use or to a folded or collapsed condition for storage or shipment.

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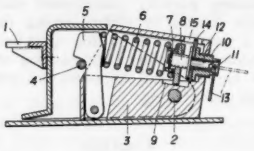
3,788,660

## SPRING LOCK

Thomas Gordon Smolka, Wien-Mauer, and Franz Hrachowitz, Wien, both of Austria, assignors to Gertsch AG, Zug, Switzerland

Filed May 19, 1972, Ser. No. 255,195
Claims priority, application Austria, June 1, 1971, 4691
Int. Cl. A63c 9/00
U.S. Cl. 280—11.35 T 9 Claims



Adjustment mechanism for a safety ski binding. Adjusting means are provided for adjusting the tension of the control spring in a safety ski binding, said adjustment means having both a coarse adjustment and a fine adjustment. The fine adjustment is accessible to the user from the outside of the binding housing but the coarse adjustment is accessible only to a person possessing suitable tools and from within such housing. The spring seat is threaded onto a screw which is coaxially received into a further screw which latter is threaded into the housing. The latter screw provides the fine adjustment and the first-mentioned screw provides the coarse adjustment.

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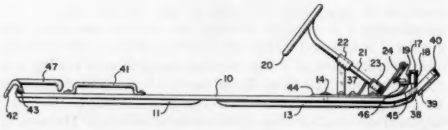
3,788,661

## STEERABLE TOBOGGAN

Cletus V. Hird, 595 North Chestnut St., Platteville, Wis.

Filed June 5, 1972, Ser. No. 259,810
Int. Cl. B62b 13/08
U.S. Cl. 280—22 4 Claims



This improved toboggan has a pair of fixed parallel rear runners and aligned therewith another pair of pivoted front runners, which are pivoted ahead of the mid-point so as to automatically return to straight ahead position after a turn, the steerable front runners having a spacer bar pivotally connected at opposite ends to their up-turned front ends and reciprocable in either of three ways: (1) by link connection with a crank on the forward end of a rotatable steering rod that is turnable with a steering wheel operated by the driver; (2) by oscillation of a foot operable steering bar having a pin and slot sliding pivotal connection with the spacer bar, or (3) by ropes attached to the opposite ends of the spacer bar. The runners project downwardly to a small extent from the flat bottom of the toboggan-like body and the steering means of all three kinds is easily operable by the driver seated on the bot-

tom in the same way as riding the ordinary toboggan, the object being to maintain a low center of gravity and thus make for safety of operation even when negotiating fairly steep side hills.

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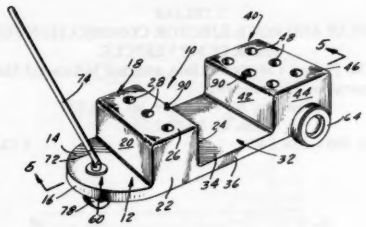
3,788,662
UTILITY CART

Richard A. Rasmussen, Long Beach, and Mariano Jimenez, Jr., Huntington Park, both of Calif., assignors to James M. Rasmussen, Inglewood, Calif.; part interest

Filed Mar. 17, 1972, Ser. No. 235,479
Int. Cl. B62b 3/00
U.S. Cl. 280—47.11 2 Claims



There is disclosed a utility cart having a uni-construction comprising a shell-like body with a leading low-bed portion followed by first and second integrally formed, box-shaped carriage housings, the housings being separated by an intermediate bed portion which is integrally attached to the opposing lower sides of each housing. The top walls of each housing are provided with a plurality of vertical receptacles for receiving various tools or articles which are adapted to be removably interconnected to a handle, the handle being removably secured to a steering means movably supported in the leading low-bed portion. A pair of wheels are operably supported in the rear area of the body whereby, together with the steering means, the cart can be transported.

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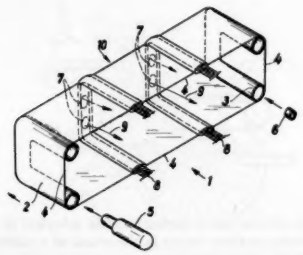
3,788,663
INFLATABLE AIR BAG FOR MOTOR VEHICLES FOR ATTENUATING THE IMPACT EFFECT OF THE PASSENGER IN CASE OF ACCIDENT

Per Olof Weman, Stockholm, Sweden, assignor to Klippan GmbH, Hamburg, Germany

Filed June 11, 1971, Ser. No. 152,129
Claims priority, application Germany, June 20, 1970, P 20 30 518.4
Int. Cl. B60r 21/10
U.S. Cl. 280—150 AB 1 Claim



Inflatable air bag having one or several air intake openings for drawing air from the passenger compartment into the air bag, and closure means for automatically sealing the air intake openings after inflation of the air bag. The closure means may consist of bands, tubes, flaps and the like.

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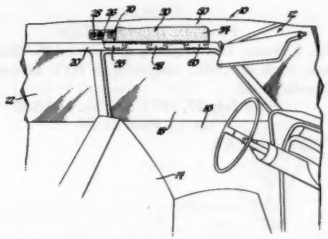
3,788,664
SHOULDER BELT STORAGE RETAINER

Thomas J. Gray, Warren; James H. DeClaire, Mt. Clemens, and Herbert D. Tucker, Rochester, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed June 5, 1972, Ser. No. 259,959
Int. Cl. B60r 21/10
U.S. Cl. 280—150 SB 6 Claims



A shoulder belt storage retainer includes an elongated resilient member having a base portion attached to a vehicle body roof structure. The elongated resilient member defines in cooperation with the body roof trim a shoulder belt storage pocket. In one form, the base portion of the elongated resilient member has integral downward extending portions in which tabs are provided. The tabs are engaged by the conventional door opening garnish molding to attach the elongated resilient member to the roof structure. In another form, the base portion is screw attached to the roof structure. A keyhole-shaped slot in the rearward end of the elongated resilient member receives the headed stud of the shoulder belt latch member to store the latch member in the storage retainer.

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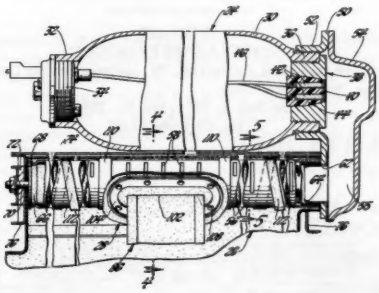
3,788,665
OCCUPANT RESTRAINT SYSTEM

James L. Noll, Livonia, and John F. Zens, Algonac, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed May 12, 1971, Ser. No. 142,533
Int. Cl. B60r 21/08
U.S. Cl. 280—150 AB 6 Claims



An occupant restraint system includes a cylindrical diffuser which is communicated with a source of pressure fluid. The diffuser includes first and second rows of axially spaced partial circumferentially extending slots, the rows being spaced circumferentially of each other. A torso cushion surrounds the

diffuser and is inflated from the first row. A knee cushion fits within the torso cushion and includes a slit in the wall thereof. Annular brackets on the inside and outside of the wall enclose a planar portion of the wall including a slit and are bolted to each other through the cushion. Encircling portions of the outside bracket receive the diffuser to locate the enclosed portion of the cushion wall tangent to the outer surface of the diffuser with the slit extending transversely of the second row of slots. A flexible sleeve is secured to the cushion wall and extends inwardly of the cushion from the slit. The sleeve provides a one-way valve permitting inflation of the cushion from the slit and preventing reverse flow of pressure fluid from the cushion.

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**3,788,666**

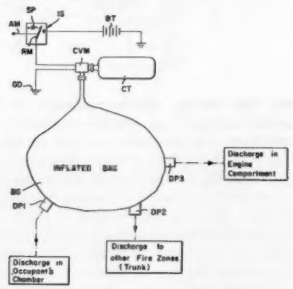
**PROTECTION SYSTEM**

**Jack M. Kramer, Los Angeles, and Abdul N. Sitabkhan, El Monte, both of Calif., assignors to HTL Industries, Inc., Monrovia, Calif.**

**Filed July 27, 1971, Ser. No. 166,528**

**Int. Cl. B60r** *21/08*

**U.S. Cl. 280—150 AB** **21 Claims**




Covers an arrangement for protecting people and property carried by a vehicle, such as an automobile or aircraft. The arrangement may include an impact switch, a control valve mechanism, a tank filled with fluid, one component of which may be a fire extinguishing agent, and an inflatable bag, the arrangement being so organized that, upon impact with another vehicle or a stationary body, the switch will complete a circuit to operate the control valve mechanism to release the fluid contents of the tank into the bag and thereby inflate it to enable it to act as a cushion. Then the bag may be deflated and the fluid released to protect the vehicle and its people and property against fire.

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**3,788,667**

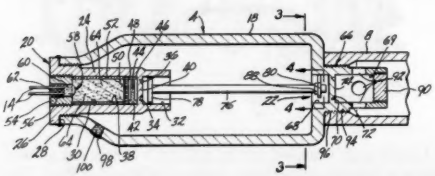
**VEHICLE SAFETY DEVICE**

**Rayburn D. Vancil, Carterville, Ill., assignor to Olin Corporation, New Haven, Conn.**

**Filed Dec. 6, 1971, Ser. No. 205,024**

**Int. Cl. B60r** *21/08*

**U.S. Cl. 280—150 AB** **10 Claims**



An apparatus for use in a vehicle safety system utilizing inflatable confinement means, a stored fluid under pressure, and a propellant charge for the generation of a hot gas. The apparatus includes a elongated reservoir for storing fluid under pressure and is provided with first and second end portions spaced apart in the direction of the axis of elongation. A fluid outlet is provided in the first end portion and has means closing it against fluid flow. A propellant charge storage chamber is provided at the second end portion and has means sealing it from the interior of the reservoir. A rod member extends from a point adjacent the fluid outlet to a point adjacent the means sealing the propellant chamber. The rod member has means for guiding and supporting it at a point adjacent each end. Upon burning of the propellant charge, the means sealing the propellant chamber is opened and the rod member serves to unseal the fluid outlet.

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**3,788,668**

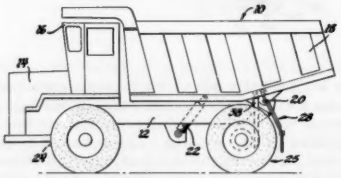
**MUDFLAP AND ROCK EJECTOR COMBINATION FOR A REAR DUMP VEHICLE**

**Julius M. Perger, Cleveland, Ohio, assignor to General Motors Corporation, Detroit, Mich.**

**Filed Oct. 30, 1972, Ser. No. 302,237**

**Int. Cl. B62d** *25/16*

**U.S. Cl. 280—154.5 R** **5 Claims**



A mudflap is attached by a pivotal connection to the underside of a dump body at a point located vertically above the rear dual tires of a rear dump vehicle and a rock ejector carried by the vehicle maintains the mudflap spaced from the tires when the dump body is in the lowered-carry-position and the raised-dump-position.

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**3,788,669**

**SAFETY DEVICE FOR MOTOR VEHICLE**

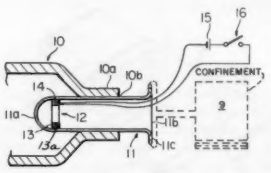
**Keizauburo Usui, Yokosuka, and Michio Yamaguchi, Yokohama, both of Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan**

**Filed July 27, 1971, Ser. No. 166,411**

**Claims priority, application Japan, Sept. 8, 1970, 45-78727; Sept. 8, 1970, 45-89333**

**Int. Cl. B60r** *21/08*

**U.S. Cl. 280—150 AB** **7 Claims**




A safety device for a motor vehicle adapted to protect a vehicle occupant from injury in the event of a collision of the motor vehicle, comprising pressurized gas supply unit including a pressurized gas generating means and a sealing means in closing engagement with a discharge outlet portion of the pressurized gas generating means. The sealing means includes a unitary casing having a closed end portion and an open end

portion and detonating means mounted at the closed end portion of the casing for rupturing, when activated, the casing thereby to provide communication between the outlet portion and the inflatable confinement whereby the pressurized gas is admitted to the inflatable confinement to actuate the same to its protective position.

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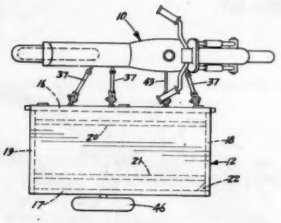
**3,788,670**
**CAMPING UNIT**
**Raymond N. Petersen, c/o Petersen Welding & Construction Co., 346 North 6th Street, Forest City, Iowa**
**Filed Nov. 12, 1971, Ser. No. 198,137**
**Int. Cl. B62k** *27/00*
**U.S. Cl. 280—203** **15 Claims**



A camper unit attachable to the side of a motorcycle. The unit includes a camping portion mounted on a frame portion attachable to the side of a motorcycle. The floor of the camping portion is comprised of a plurality of panels hingedly connected which fold together to form a box-like structure for transport to and from a camping location. The hinges connecting the panels are mounted in grooves provided in the ends of the respective connected panels for strength and obscurity. A tent provides the shelter for the camping portion. Jointed tent poles serve also as support members for the floor. Removable legs are provided for further floor support. A portion of the floor is supported by the wheel attached to the frame. Hitch means connecting the camper unit to the motorcycle is adjustable whereby the camper unit may be attached to a wide variety of motorcycles of different manufacture and model. The camper unit is adaptable to be trailed behind a snowmobile or a small automobile.

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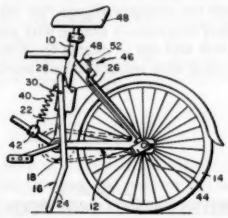
**3,788,671**
**KICK STAND**
**Alexander D. MacAlpine, 50 North Main Street, Natick, Mass.**
**Filed Mar. 20, 1972, Ser. No. 236,421**
**Int. Cl. B62h** *1/02, 5/00*
**U.S. Cl. 280—303** **7 Claims**



A kick stand provided with a split clamping sleeve by means of which it may be attached to the frame of a bicycle astride the rear wheel fork for pivotal movement from a position in engagement with the ground to support the bicycle in an upright position to a rearwardly disposed position for storage when the bicycle is being ridden and a spring for moving the kick stand to its stored position into engagement with spring clips adapted to hold the kick stand in said stored position.

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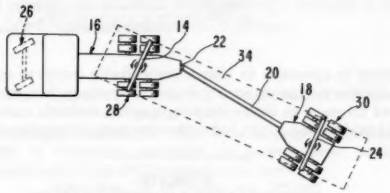
**3,788,672**
**ROLLER BEARING FOR LOGGING TRUCK AND TRAILER**
**Jack L. Tharp, P.O. Box 867, Willits, Calif.**
**Filed May 26, 1972, Ser. No. 257,118**
**Int. Cl. B62d** *53/08*
**U.S. Cl. 280—404** **9 Claims**



An improved roller bearing for the pivotal, log-supporting bunks of a logging truck-trailer combination. Each bunk has four such bearings, two near each end and on opposite sides of the bunk. The bearings are engageable with the flat, upper surface of the support structure below the bunk to allow the bunk to pivot easily relative to the support structure. Each roller has its longitudinal axis aligned with the pivotal axis of the bunk.

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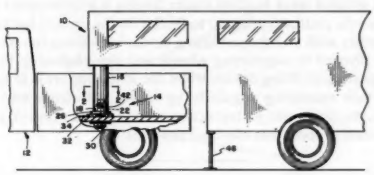
**3,788,673**
**TRAILER HITCH**
**Lyle R. Gloege, 843 Greenway Ct., Derby, Kans.**
**Filed July 11, 1972, Ser. No. 270,843**
**Int. Cl. B62d** *53/00*
**U.S. Cl. 280—423 R** **7 Claims**



A gooseneck trailer hitch including a vertically positioned tubular member attached to the trailer with a bearing edge at its open end for receipt of a cone-shaped hitch member rotatably mounted on a truck bed having a load bearing flange around the bottom thereof for supporting the bearing edge of the tubular member and a loosely fitting locking pin passing through both the tubular member and cone-shaped hitch member allowing a certain degree of tilt between the tubular member and hitch member.

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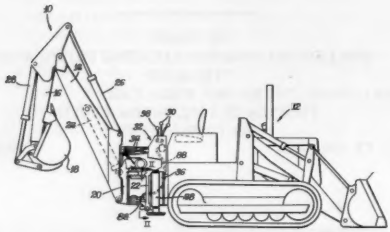
**3,788,674**
**CLAMPING MECHANISM FOR SIDE SHIFTABLE BACKHOE**
**Robert Casey, Washington, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.**
**Filed Aug. 17, 1972, Ser. No. 281,516**
**Int. Cl. B60d** *7/00*
**U.S. Cl. 280—456** **20 Claims**

There is disclosed a backhoe having a base frame that is mounted to be stationary with respect to a vehicle. A shiftable

frame is slidably mounted on the base frame and supports a digging arm and bucket at an infinite number of positions transverse to the axis of the vehicle. A hydraulically actuated



clamp is operative to clamp the shiftable frame at selected positions on the stationary frame. The clamp is constructed and arranged to utilize the weight of the shiftable carriage to aid in clamping action and to thereby reduce clamping effort.

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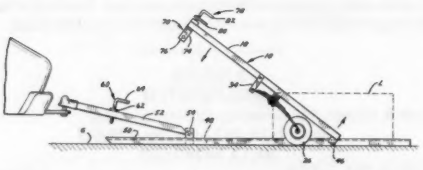
**3,788,675**

## GROUND LEVEL LOADING TRAILER

**Roger R. D. Wilander, 926 North Central Avenue, Duluth, Minn.**

**Filed May 1, 1972, Ser. No. 249,613**
**Int. Cl. B60p** *1/00*
**U.S. Cl. 280—43.11** **6 Claims**



A ground level loading trailer having a load support in the form of a platform adapted to lie flat on the ground for loading together with a U-shaped lifting device straddling the platform and pivoted on supporting wheels and also pivoted to the load support, said lifting device when the load support is in loading position extending angularly upwardly therefrom and when brought down into juxtaposition with the load support, raising the load support into elevated position.

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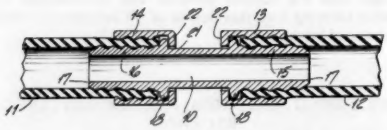
**3,788,676**

## FLEXIBLE HOSE CONNECTOR

**Robert A. Lossie, 2445 N. Dunlap Street, St. Paul, Minn.**

**Filed Jan. 31, 1972, Ser. No. 221,968**
**Int. Cl. F16l** *33/22*
**U.S. Cl. 285—247** **1 Claim**



A coupler unit for connecting two flexible hoses in a watertight joint. The unit consists of a short length of tubing with a special male thread on each end, together with two loose captive female threaded members. The hose to be coupled is forced over a male threaded end of the tubing, and the female threaded member is rotated over the outer periphery of the hose, forcing the coupled hose into a threaded engagement with both the connector, and the female threaded member.

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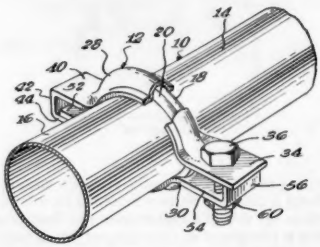
**3,788,677**

## EMISSION-FREE EXHAUST PIPE JOINT AND CLAMP THEREFOR

**Bertil Stade, 480 Knollwood Drive, Wood Dale, Ill., and Edward Hoglund, 1020 Lois Avenue, Park Ridge, Ill.**

**Continuation-in-part of Ser. No. 142,977, May 13, 1971, abandoned. This application Mar. 20, 1972, Ser. No. 236,364**
**Int. Cl. F16l** *17/00*
**U.S. Cl. 285—367** **11 Claims**



The joint of the invention comprises exhaust pipes formed with beaded ends providing abutting flange-like surfaces that are axially forced together by a clamp applying wedging forces on the external beads. Modified forms of the joint have pilot extensions on one pipe of the joined pair, the bead on this one pipe in each case being spaced from the free end of the pipe. The pilot extension is telescoped within the other pipe bringing the beads together side by side and the clamp is engaged over both beads. In some joints, such as those formed in pipes made of a tough metal, a gasket may be inserted between the beaded ends.

The clamp for the joints is one which has a concave groove engaging over the pair of beads to apply the axial force by the wedging action produced when the clamp is constricted. The preferred clamp is made in two halves which have a hinged connection of great simplicity comprising merely a rectangular bight formed on one end of one half and a tongue formed on one end of the second half. The tongue lies in the bight and cannot move laterally because of the self-centering action produced when the clamp is engaged on the beads. The other end of each half comprises a tongue with perforations aligned to receive a bolt and nut to enable the halves to be clamped together, pivoting with respect to one another on the hinged connection.

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**3,788,678**

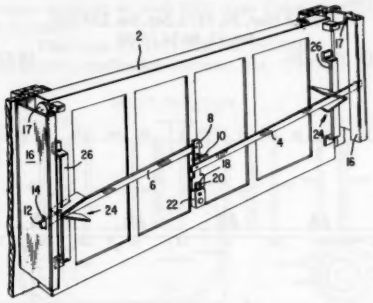
## ADJUSTABLE GARAGE DOOR LOCK

**Harold Switzgable, 125 Stokes Street, Box 622, Freehold, N.J.**

**Filed Sept. 25, 1972, Ser. No. 291,656**
**Int. Cl. E05c** *5/00*
**U.S. Cl. 292—7** **2 Claims**

A guide for the locking bar of an over-head garage door, or the like, is adjustably mounted on the door to permit the end

of the bar adjacent the edge of the door to be moved into a position wherein it will register with an opening in a stationary



member adjacent the door in various positions of the door with respect to the stationary member.

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3,788,679

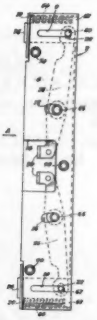
## DOOR FASTENING UNITS

John Anthony Banham, 233/235 Kensington High Street, London, W8 England

Filed Aug. 2, 1971, Ser. No. 168,000

Int. Cl. E05b 9/00; E05c 1/06, 9/10

U.S. Cl. 292—40 12 Claims



A door fastening device supplements the function of a door lock and has bolt members that are slid to operative positions by the shooting of the lock bolt. Actuating means of the device are adjustable after the device has been mounted in place to ensure that the lock bolt will operate the bolt members fully. The attachment means of the device are hidden by a separate cover after adjustement of the actuating means and the cover carries a separate striker plate which allows the lock bolt to hold the door closed without undue play but which is displaceable when force is exerted on the door to allow the lock bolt and the bolt members jointly to resist forcible opening of the door.

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3,788,680

## ORDNANCE HANDLING DEVICE

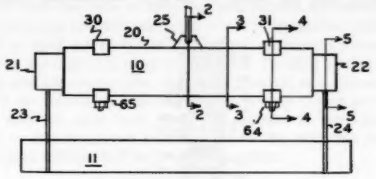
Malcolm B. Brown, Oreland, Pa., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed June 21, 1972, Ser. No. 265,084

Int. Cl. B66c 1/12

U.S. Cl. 294—81 R 7 Claims

The invention disclosed herein relates to a lifting member and more specifically to an extendable type horizontal lifting bar adapted for adjustment by a pair of slidable telescoping members and a unique clamping device for rigidly affixing



them in individual positions for adjustment to maintain a load to be lifted in a horizontal position at all times.

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3,788,681

## ARRANGEMENT OF THE DRIVE AND SUPPORT OF WINDSHIELD WIPERS

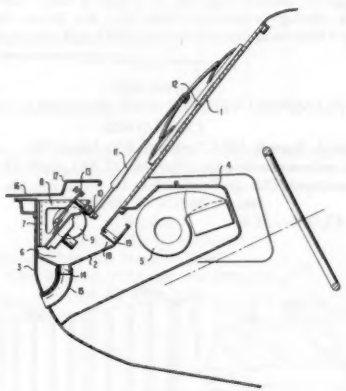
Bela Barenyi, Maichingen, and Gerhard Busch, Gechingen, both of Germany, assignors to Daimler-Benz Aktiengesellschaft, Stuttgart-Unterturkheim, Germany

Filed Mar. 24, 1972, Ser. No. 237,842

Claims priority, application Germany, Mar. 25, 1971, 2114424

Int. Cl. B60s 1/04

U.S. Cl. 296—28 R 22 Claims



An arrangement of the drive and bearing supports of windshield wipers for vehicles, especially for passenger motor vehicles, which are accommodated in front of the windshield pane; a sheet metal member adjoins the windshield which is connected with a front wall separating the engine space from the passenger space, whereby the drive and the bearing supports of the windshield wipers are mounted at the front wall.

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3,788,682

## TRAILER CONSTRUCTION

Donald J. Ehrlich, Monon, Ind., assignor to Monon Trailer Inc., Monon, Ind.

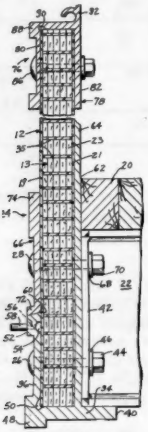
Continuation-in-part of Ser. No. 74,713, Sept. 13, 1970, Pat. No. 3,692,349. This application Apr. 1, 1971, Ser. No. 130,188. The portion of the term of this patent subsequent to Sept. 19, 1989, has been disclaimed.

Int. Cl. B62d 27/00, 25/02

U.S. Cl. 296—28 M 5 Claims

A vehicle body panel comprises a plywood core having glass fiber reinforced plastic coatings on opposite sides thereof. The

core has holes therein so that during curing and heating of the resin, air bubbles at the interfaces of the coatings and the core will be forced into the holes. In addition, the plastic will be extruded into the holes to form a mechanical connection



between the coatings. The panel is secured to a vehicle by an elongated channel rail that is joined to floor beams of the truck through connector bolts that are below the vehicle body's floor so as not to interfere with cargo placed therein.

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**3,788,683**

## TRANSPORT VEHICLE WITH PORTABLE CARGO CONTAINER

**James A. Rumell, 1955 Vermont, Blue Island, Ill.**

**Continuation-in-part of Ser. No. 27,361, April 10, 1970, abandoned. This application July 10, 1972, Ser. No. 269,978**

**Int. Cl. B60s** *9/14;* **B62d** *27/06*

**U.S. Cl. 296—35 A** **8 Claims**

A transport vehicle having a wheeled bed and a removable and reusable freight hauling and storing container which is releasably mounted on the bed to form the transport body of the vehicle. The container includes a rectangular base and frame with upstanding side and end walls defining a freight receiving area. Retractable and extensible dolly wheels are located near the corners of the base at one end thereof and near the center of the base at the other end; and a self-contained hydraulic system retracts or extends the wheels to convert the container from an immobile frame-based storing container to a mobile wheeled hauling container. The wheels are all within the rectangular frame so that the resulting container may be maneuvered about a loading area, or onto or off a ship or dock, without requiring high-capacity cranes or other special container-handling facilities.

**3,788,684**

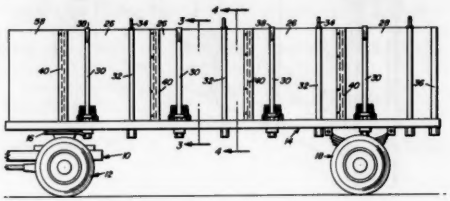
## REMOVABLE GRAIN BODY SIDES FOR FLAT LOAD BED

**Davis O. Johnson, and Terry Lee, P.O. Box 235, both of Hayti, S. Dak.**

**Filed Mar. 30, 1972, Ser. No. 239,448**

**Int. Cl. B62d** *27/06*

**U.S. Cl. 296—36** **10 Claims**



A side wall assembly for a flat load bed of the type including longitudinally spaced upwardly opening opposite side mounting pockets. The assembly consists of upstanding stakes downwardly seatable in the pockets and provided with laterally projecting downwardly opening upper end hook portions, spring-type readily releasable anchors for securing the stakes in the pockets and body side panels removably positionable against the inner sides of the stakes and over whose upper marginal edge portions the stake hook portions are engaged.

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**3,788,685**

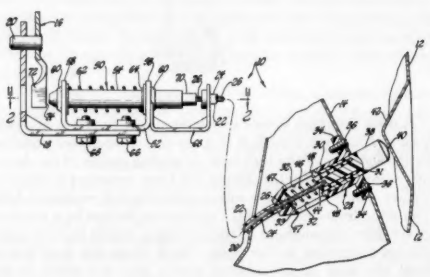
## BOWDEN CABLE LATCH RELEASE MECHANISM

**Ludwig Leichtl, Emmaus, Pa., assignor to McCord Corporation, Detroit, Mich.**

**Filed Apr. 17, 1972, Ser. No. 244,817**

**Int. Cl. B60n** *1/00*

**U.S. Cl. 296—65 A** **6 Claims**



This invention provides a seat back release mechanism for tiltable automobile seats actuated by an automobile door which includes a flexible motion transmitting remote control cable for transmitting compressive and tensile forces in a curved path; a reciprocating piston member connected to one end of the remote control cable, mounted in a housing, and adapted to transmit a compressive force in response to the closure of the automobile door, and a latch mechanism connected to the other end of the remote control cable for engaging and latching the seat back whereby the seat back is held substantially upright and is restricted from forward tilting movement when the automobile door is closed.

3,788,686

## CAR BODY FOR MOTOR VEHICLES

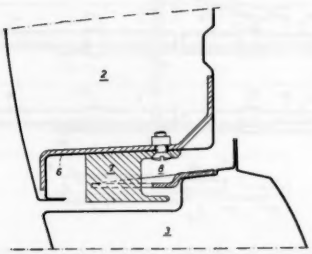
Egbert Rossie, Ingolstadt, and Bernd Barke, Ettling, both of Germany, assignors to Audi NSU Auto Union A.g., Ingolstadt, Germany

Filed June 23, 1971, Ser. No. 155,960

Claims priority, application Germany, July 7, 1970, P 20 33 531.3

Int. Cl. B60j *5/04*

U.S. Cl. 296—146 3 Claims



A motor vehicle is provided with a device protecting it from accidents affecting the sides of the car body. The device includes a hook fixed to each door of the car and having a recess directed toward the interior of the car.

3,788,687

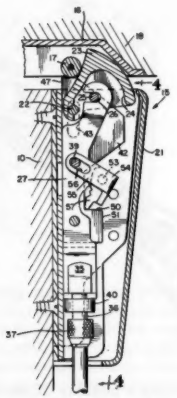
## SAFETY EXIT LATCH BOLT RETAINER

George Z. Zawadzki, Indianapolis, Ind., assignor to Van Duprin, Inc., Indianapolis, Ind.

Filed May 4, 1972, Ser. No. 250,236

Int. Cl. E05c *15/02*

U.S. Cl. 292—92 5 Claims



A safety exit latch bolt retainer comprising a housing, a fallaway latch bolt pivoted in the housing for movement between a retracted position and a projected position wherein it is located for cooperation with a strike member, a retractor guided for reciprocation in the housing, operatively connected to shift the latch bolt between its projected and retracted positions and adapted for connection to a panic bar or the like, a slide guided in the housing for reciprocation alongside the retractor between a retracted position and a projected position for cooperation with such a strike and resiliently biased toward such projection position, and a detent lever pivoted within the housing, having one arm operatively connected to move with the retractor and having another arm positioned to cooperate with the slide to hold the slide against movement toward projected position when the bolt is in projected position and to hold the retractor against bolt-projecting movement when the slide is in projected position, the slide having a camming surface cooperative with such a strike, as a closure on which the housing is mounted moves toward closed position, to shift the slide from projected position to retracted position, to trip the detent lever to release the retractor for movement to shift the bolt to projected position.

3,788,688

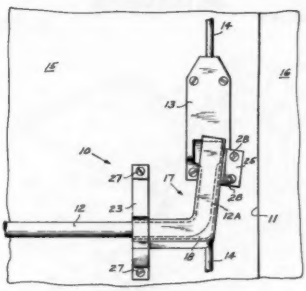
## CRASH BAR BRACKET ASSEMBLY

William T. Chandler, 9134 Palm, Bellflower, Calif.

Filed Jan. 5, 1973, Ser. No. 321,338

Int. Cl. E05c *15/02*

U.S. Cl. 292—92 2 Claims



A unit attached at the operating end of a crash bar inhibits illegal entry by use of wire hooks or the like.

3,788,689

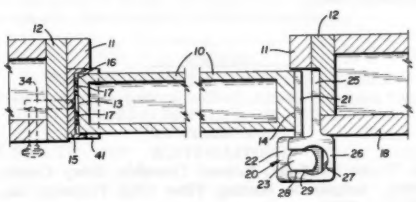
## DOOR LOCKING MEANS

Richard L. Lloyd, 2740 Iliff, Boulder, Colo.

Filed Oct. 24, 1972, Ser. No. 299,676

Int. Cl. E05c *3/04*

U.S. Cl. 292—304 11 Claims



Door locking means comprising a door for closing an opening surrounded by a frame that has a channel extending from top to bottom of one side, the door being hingedly connected to the side of the frame opposite said channel side, and being non-pivotally movable relatively to the frame in the direction of the door width to move the door into and out of the frame channel. Each of the hinges comprises a pin and a journal in which the pin has pivotal movement when the door has been withdrawn from the channel and in which the pin also is laterally movable to permit non-pivotal movement of the door into and out of the frame channel. Lockable means which may be a cam plate bears on the door edge opposite the frame

channel to move the door into the channel. The cam may be provided with a key-operated lock cooperating with means on the frame for retaining the door in the channel and preventing movement of the door from either side. The doors embodying the invention may be house, cabinet or other type doors.

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**ERRATUM**

For Class 294—81 see:
Patent No. 3,788,680

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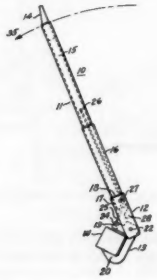
**3,788,690**
**BILLET TURNING WRENCH**

**Nicholas Gelles, Conemaugh; Paul J. Shiley, Johnstown, both of Pa., and Michael D. Casella, Cleveland, Ohio, assignors to Bethlehem Steel Corporation and Rose Iron Works, Inc., both of Bethlehem, Pa.**

**Filed Nov. 29, 1971, Ser. No. 204,779**
**Int. Cl. B65g** *7/08*
**U.S. Cl. 294—17** **6 Claims**



Apparatus for rotating billets, blooms and the like to present successive faces for inspection and/or treatment comprises an elongated handle having a load engaging jaw pivotally connected at one end thereof with means to permit limited rotation of said jaw and return of said jaw to a retracted position.

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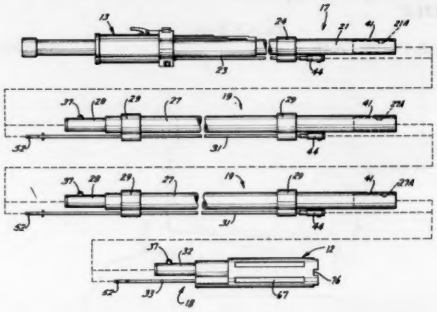
**3,788,691**
**SHOTGUN STICK**

**Earl Wayne McMullin, Rutland Township, Barry County, Mich., assignor to Hastings Fiber Glass Products, Inc., Hastings, Mich.**

**Filed Apr. 17, 1972, Ser. No. 244,428**
**Int. Cl. A47f** *13/06*
**U.S. Cl. 294—19 R** **16 Claims**

A shotgun stick for applying and removing devices, such as clamps, to and from electrical lines or conductors. The stick includes an elongated support rod having an insulated head at one end and a movable actuating handle at the other end. An operating rod extends from the handle and is slidably received within the insulated head. The operating rod is connected to a clamping mechanism which is slidably disposed within the head whereby actuation of the handle causes linear movement of the operating rod for causing a corresponding movement and actuation of the clamping mechanism. The support rod and the operating rod are both of sectional construction and include a plurality of intermediate sections which can be individually inserted into or taken out of the stick for permitting



selective adjustment in the overall stick length. Locking devices are provided for releasably locking together the sectional parts of the support rod and the operating rod.

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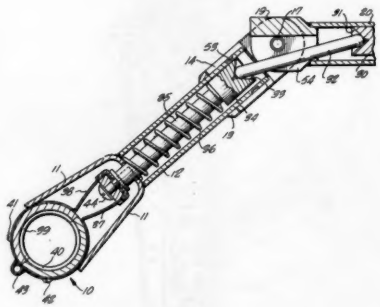
**3,788,692**
**UNIVERSALLY JOINTED CHILLING TOOL**

**Christopher L. Fischer, Sunnyvale, Calif., assignor to Raychem Corporation, Menlo Park, Calif.**

**Filed Aug. 23, 1971, Ser. No. 173,975**
**Int. Cl. A47f** *13/06*
**U.S. Cl. 294—19 R** **9 Claims**



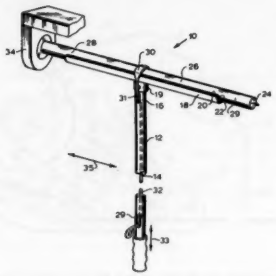
A hand tool having a plurality of part-holding jaws which are operated from a remote handle through a shaft having a universal joint therein. The tool is capable of being used to hold a part in its jaws while that part is immersed in a very low temperature fluid such as liquid nitrogen. After the part has been thus chilled, the tool is capable of physically holding the chilled part while the part is moved to a different environment while maintaining the part in a chilled condition. The universal joint permits free rotational movement of the jaws with respect to the handle and also permits angular movement in the shaft of the tool. Tightening means are provided which permit holding the angular and rotational position of the jaws in a fixed position with respect to the handle.

3,788,693

## FLUORESCENT BULB HANDLING APPARATUS

Bob H. Farrington, 5604 Astoria Pl., Orlando, Fla.

Filed July 24, 1972, Ser. No. 274,219
Int. Cl. H01k 3/32
U.S. Cl. 294—20 4 Claims



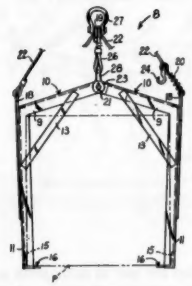
A fluorescent bulb changer comprises an elongated handle with a trough on one end. A resilient hook which is controlled from the other end of the handle, engages the bulb and holds it firmly in the trough.

3,788,694

## ARTICLE HANDLING SYSTEM

Glen Henry Hall, Box 284, Fort Ashby, W. Va.

Filed July 19, 1971, Ser. No. 165,859
Int. Cl. B66c 1/32
U.S. Cl. 294—67 BC 2 Claims



In an article handling system having article handling means for carrying a stack of articles comprising a pair of lift arms, a rigid pivot rod pivotally joining said lift arms together, a lift cable and an opening cable operatively arranged such that: the lift arms are arranged to swing inwardly toward each other to engage and carry the stack of articles upon application of an external lifting force to the lift cable, and the opening cable is constructed to have a lifting force applied thereto to swing the lift arms apart so that they clear the stack of articles, improvement in the article handling means comprising each lift arm pivotally connected to the pivot rod at opposite ends thereof, the lift cable joined to the pivot rod at opposite ends thereof, the opening cable joined to the lift arms and disposed at a substantially right angle in respect to the lift cable, one end of the opening cable relatively permanently connected to one lift arm and the other end thereof manually connectable or disconnectable in respect to the other lift arm, two shackles mutually interlocked and arranged so that one has the external lifting force applied thereto and lifts the other, the lift cable extending through one of the shackles, the opening cable extending through the other of the shackles, whereby when the opening cable is disconnected the lift cable is made taut to lift the article handling means to carry the stack of articles, and whereby when the opening cable is connected it is made taut to lift the empty article handling means to swing and spread the lift arms apart.

## ERRATA

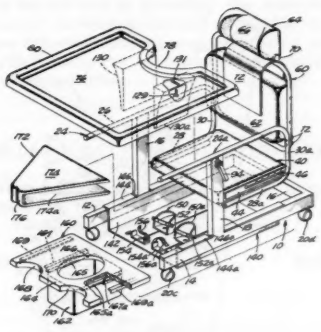
For Classes 296—28, 296—35, 296—36, 296—65 and 296—146 see:
Patents Nos. 3,788,681 and 3,788,686

3,788,695

## SITTING/STANDING TABLE/WALKER COMBINATION

Nazih M. N. Salem, 963 N. Larrabee St., Apt. 8, Los Angeles, Calif.

Filed July 12, 1971, Ser. No. 161,444
Int. Cl. A47d 13/04
U.S. Cl. 297—6 4 Claims



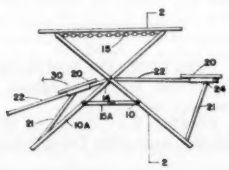
The invention is a therapeutic device or appliance for treating people, particularly children, afflicted with diseases such as cerebral palsy, muscular distrophy, and similar incapacitating diseases. It is a sitting/standing table adapted as a walker. The seat is adjustable for standing. Vertical adjustments are provided for table and seat. Adjustable supports are provided for the patient's thighs. Attachments are provided, including commode, abduction seat, and footrest platform.

3,788,696

## FOLDABLE TABLE AND BENCH ASSEMBLY

Jacob L. Loewen, General Delivery, Altona, Manitoba, Canada

Filed July 20, 1972, Ser. No. 273,389
Int. Cl. A47b 39/00
U.S. Cl. 297—159 8 Claims



A pair of leg frames are pivoted between the ends to present an "X" formation when open and support a table top. A bench

is erected upon each side of the table and includes horizontal tension arms, substantially vertical compression legs and a bench seat. As the horizontal arms are moved from the folded position to the horizontal position, the vertical legs are unfolded and support the bench surface which moves to the horizontal position. The benches are first folded down and then the cross frames are folded together with the table top lying substantially vertically against the folded structure, when the assembly is in the folded or stored position.

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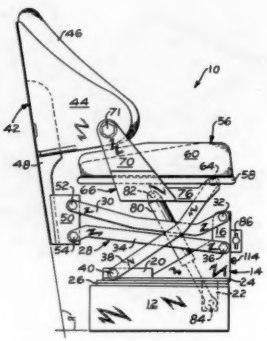
**3,788,697**
**VEHICLE SEAT**

**James C. Barton, Peoria; Jon C. Christensen, Washington; James P. Mueller, East Peoria, and Larry W. Sprinkle, Decatur, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.**

**Filed Apr. 6, 1972, Ser. No. 241,640**
**Int. Cl. A47c** *3/00, 3/22*
**U.S. Cl. 297—307** **7 Claims**



An improved vehicle seat wherein a bottom cushion assembly is pivotally attached to a back and resiliently mounted upon a base by an oscillation damping member to control oscillation of said vehicle seat with respect to the base. The back is pivotally joined to the base by substantially parallel links which maintain the back at a constant angle of inclination with respect to the base independent of elevational displacement. A swing link, pivotally connecting the bottom cushion assembly to the base permits the bottom cushion assembly to pivot about an imaginary point forward of the seat at a height approximating the knee joint of an operator to minimize movement of the operator's feet relative to the vehicle. A hydraulic circuit associated with a hydropneumatic suspension for such a seat includes dual damping capabilities for accommodating both normal and high impact loads on the seat.

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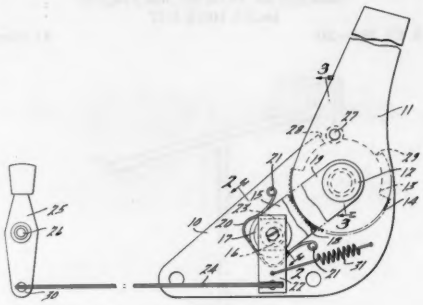
**3,788,698**
**SEAT RECLINE MECHANISM**

**Norman W. Perkins, Benfleet, England, assignor to Ford Motor Company, Dearborn, Mich.**

**Filed May 8, 1972, Ser. No. 251,310**
**Claims priority, application Great Britain, Nov. 26, 1971, 54,934/71**
**Int. Cl. B60m** *1/02;* **E05d** *11/10*
**U.S. Cl. 297—373** **5 Claims**

A seat recline mechanism in which a fixed toothed sector connected to a seat back is engaged by a movable toothed locking member mounted on a mounting plate connected to a seat cushion. The teeth of the locking member are of substantially the same pitch as those of the fixed tooth sector and are positioned on an arc having a center of curvature outside the pivotal axes of the sector and the locking member.



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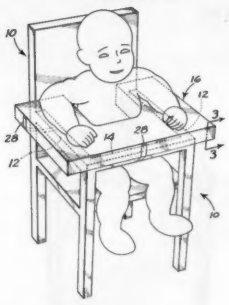
**3,788,699**
**SUPPORT CUSHION FOR CHILDREN'S AND INVALID'S SEATS**

**Fowler K. Starr, 800 S. Third, Kelso, Wash.**

**Filed Oct. 26, 1972, Ser. No. 301,092**
**Int. Cl. A47d** *1/00*
**U.S. Cl. 297—390** **5 Claims**



A support cushion for use in seats such as childrens' high chairs and invalids' wheelchairs having an arm on each side and a cross member across the outer ends of the arms comprises a piece of resiliently compressible material dimensioned to overlie the arms and cross member. The piece has a recess dimensioned to receive the body of the seat occupant. A flange of resiliently compressible material extends downwardly along the lower margin of the recess. In use, the flange compresses into the space between the seat occupant's body and the seat components, bolstering the occupant in an upright position.

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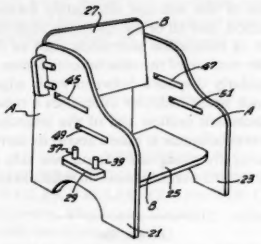
**3,788,700**
**MULTIFUNCTIONAL PEGGED FURNITURE**

**Richard M. Wartes, 14400 Addison St., Sherman Oaks, Calif.**

**Filed Aug. 29, 1972, Ser. No. 284,678**
**Int. Cl. A47c** *27/08, 4/02*
**U.S. Cl. 297—442** **17 Claims**

Pegged furniture is made out of flat frame members having slotted holes and flat bridging members having reduced ends

to fit through the holes. The frame members may have extra slots so that you can make functionally different kinds of furniture. Special tapered pegs, which are made of slotted dowel stock having a tapered flat on one side, are pegged through angled holes in the bridging members to removably hold the furniture together to perform the desired function. Some particular items of furniture include (1) an alternate chair and step stool; (2) another step stool which doubles as a hamper; (3) a two-level table; (4) a chair and table; (5) a bench and chest; (6) a cradle which can also be converted into three other uses including benches and a table, a rocking bench, and a toy box.

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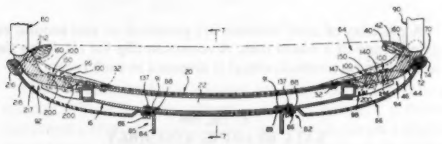
**3,788,701**
**CHAIR CONSTRUCTION**
**Raymond A. Massaccesi, Lombard, Ill., assignor to All-Steel Inc., Aurora, Ill.**
**Filed May 26, 1972, Ser. No. 257,249**
**Int. Cl. A47c** *7/02, 1/12*
**U.S. Cl. 297—455** **7 Claims**



A chair construction comprising a frame in the form of a pair of L-shaped rigid frame members, defining the frame back and seat reinforcing portions secured together in side by side spaced apart relation by a pair of cross members applied between the frame member seat portions, contoured seat and back upholstery plates each having a separate cushion pad applied thereto, with the plates being made fast to the frame and between said frame members to form a seat subassembly, and with the plates having their side edges aligned about the rim of the subassembly, and a one piece shell of concavo-convex, L-shaped configuration having a continuous rim thereabout substantially complementing that of the subassembly, with the subassembly received in the shell and the shell secured to the subassembly at an indentation formed in the underseat portion of the shell, and about the rims of the shell and subassembly. A molding about the rim of the shell masks the fastening elements about the shell rim and forms a bumper for the chair, and a conventional chair base is affixed to the frame at the shell indentation.

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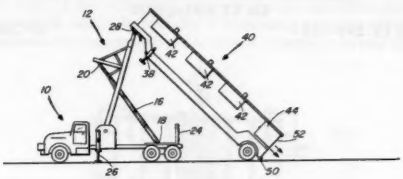
**3,788,702**
**BULK MATERIAL HANDLING SYSTEM**
**Carl L. Toboll, 8003 Haas Ln., Rosedale, Md.**
**Filed Feb. 9, 1972, Ser. No. 224,874**
**Int. Cl. B60p** *1/18, 1/28*
**U.S. Cl. 298—22 AE** **5 Claims**




An improved system for the handling of bulk materials such as trash refuse, is provided. This system consists of two units, one of which is a large drop frame trailer, enclosed on all of its four sides, with door openings on the sides, the rear end and the top completely open, for loading. A door opening is also provided at the rear end for unloading. The other unit is a modified tractor on which is mounted a hydraulic operated hoist. It has a fifth wheel coupling arrangement and a capability of lifting the trailer up end to a required height of 30 feet for unloading of the trash refuse.

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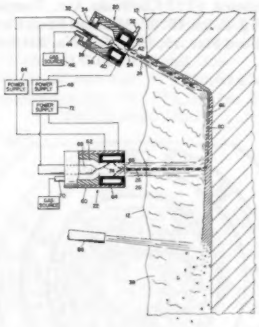
**3,788,703**
**METHOD OF ROCK CUTTING EMPLOYING PLASMA STREAM**
**Merle L. Thorpe, Hopkington, N.H., assignor to Humphreys Corporation, Bow, N.H.**
**Filed Apr. 14, 1972, Ser. No. 243,961**
**Int. Cl. E21c** *37/18*
**U.S. Cl. 299—14** **22 Claims**



A method especially useful for cutting and breaking hard rock such as granite from the face of a tunnel is disclosed. A pattern of slots are cut into the rock face by directing a high velocity plasma jet on the rock face to melt a portion of the rock face and produce a molten film and applying electrical power to the plasma-jet and a cooperating electrode to flow electric current through the molten film to further heat the molten film and melt additional rock to form a slot. After the pattern of slots are formed, spaced plasma streams are introduced into the slots and electrical power of a frequency effective to produce dielectric heating in the rock is applied through the plasma streams to produce a heated region within the rock mass which thermally stresses and severs that rock mass portion into fragments.

**3,788,704**

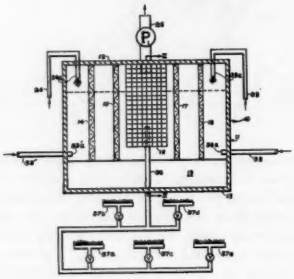
## WATER SYSTEM IN MULTIPLE GROOVING OF PAVEMENT

**Donald C. Staab, Warrington, Pa., assignor to Cardinal Industries Incorporated, Conshohocken, Pa.**

**Continuation-in-part of Ser. No. 212,253, Dec. 27, 1971, and a continuation-in-part of Ser. No. 212,475, Dec. 27, 1971. This application Sept. 15, 1972, Ser. No. 289,686**

**Int. Cl. E01c** *23/09*

**U.S. Cl. 299—18** **10 Claims**



Water used for cooling and lubricating cutting heads in multiple grooving of pavement is picked up in the form of a slurry containing dislodged particles of pavement material and cutter material and is recovered relatively free of such particulate material for reuse. The system provides first and second separation regions in which the slurry is concentrated progressively and maintains circulation between the first separation region and the slurrying region and between the respective separation regions.

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**3,788,705**

## VEHICLE WHEEL AND SPIDER THEREFOR

**James L. Brainard, 6237 Kauffman Ave., Temple City, Calif., and Robert J. Palm, 18297, Midbury Brea, Calif.**

**Filed Mar. 15, 1972, Ser. No. 234,868**

**Int. Cl. B60b** *1/10*

**U.S. Cl. 301—9 DN** **10 Claims**

A vehicle wheel adapted to mount to a plurality of stud patterns which comprises a peripheral tire-receiving rim with a circularly sectioned inner aperture having an inner peripheral wall to which a spider is joined. The spider has a central axis in common with the rim, an outer peripheral flange joined to the inner wall of the rim and an inner peripheral flange which bounds a central aperture. An annular attachment section lies adjacent to the inner peripheral flange, and a dished annular interconnecting section joins the attachment section to the outer peripheral flange. Two sets of stud-receiving holes are formed in said attachment section, the radial spacing from the central axis of one set being different from that of the other set, the said spacings of all holes of the same set being equal. The number of holes in each set is either four or five, and the numbers of holes in both sets for any given wheel are equal. The members of the sets are alternately formed in the attachment section, and all of the holes are uniformly angularly spaced apart. A truncation surrounds each of the holes and rises above the surface of the attachment section. A stress collector is angularly disposed between each adjacent pair of holes, and each stress collector comprises a raised portion of both the attachment section and of the interconnecting section. Each stress collector is raised above its surrounding area to form a generally triangular rise on one side of the spider which tapers toward a region between adjacent truncations.

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**3,788,706**

**Patent Not Issued For This Number**

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**3,788,707**

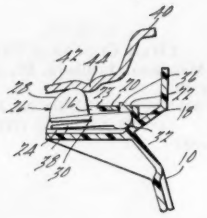
## WHEEL TRIM RETENTION

**James Connell, 5017 Dianna Dr., Bloomfield Hills, Mich.**

**Filed Oct. 2, 1972, Ser. No. 294,375**

**Int. Cl. B60b** *7/06*

**U.S. Cl. 301—37 P** **12 Claims**



A plurality of axial recesses are provided on and around an axial flange of a wheel trim. A retention clip for retaining the wheel trim on a vehicle wheel is disposed in each recess.

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**3,788,708**

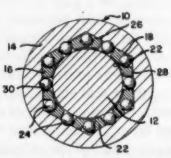
## BALL BEARING ASSEMBLY

**Albert R. McCloskey, Fairfield, Conn., assignor to Heim Universal Corporation, Fairfield, Conn.**

**Filed July 14, 1972, Ser. No. 271,776**

**Int. Cl. F16c** *29/06*

**U.S. Cl. 308—6 C** **5 Claims**



An anti-friction ball bearing assembly adapted for mounting on a shaft comprising an outer sleeve and an inner sleeve concentrically fitting within the outer sleeve, the inner sleeve having a number of tracks defining paths for the circulation of

balls between the sleeves and the shaft during movement between the shaft and the bearing assembly, the outer surface of the inner sleeve being polyhedronal in shape, the inner surface of the outer sleeve being substantially polyhedronal in shape and generally conforming to the shape of the outer surface of the inner sleeve, the inner surface of the outer sleeve having a number of axially extending arcuately shaped bearing raceways whose radii generally correspond to the radii of the balls, the balls being in full race curvature contact with the raceways while the balls are in their active load carrying positions between the shaft and the outer sleeve.

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**3,788,709**

## HYDRAULIC BRAKE CONTROL APPARATUS FOR A TRAILER HAULED BY A MOTOR CAR

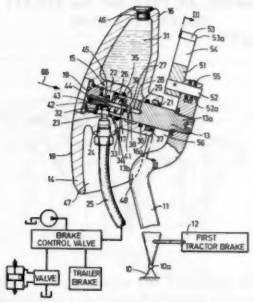
**Guenther Schwerin, Moglingen, Germany, assignor to Robert Bosch GmbH, Stuttgart, Germany**

**Filed Sept. 21, 1972, Ser. No. 290,885**

**Claims priority, application Germany, Sept. 22, 1971, 2147178**

**Int. Cl. B60f** *13/14*

**U.S. Cl. 303—7** **13 Claims**




The hydraulic brake of a trailer is connected by a pressure conduit with a pressure chamber formed between a brake pedal and a brake lever of a driver-operated brake on a motor car or tractor hauling the trailer. Upon depression of the brake pedal, not only the brake of the tractor is actuated, but also the hydraulic brake on the trailer, since fluid is pressed out of the pressure chamber through the pressure conduit into the hydraulic actuator of the trailer brake.

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**3,788,710**

## ANTISKID CONTROL SYSTEM

**Hubertus Von Grunberg, Niederhochstadt; Werner Fink, and Dieter Kircher, both of Frankfurt, all of Germany, assignors to ITT Industries, Inc., New York, N.Y.**

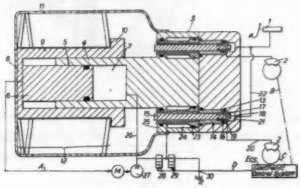
**Filed Aug. 21, 1972, Ser. No. 282,532**

**Claims priority, application Germany, Aug. 25, 1971, 2142552**

**Int. Cl. B60t** *8/04*

**U.S. Cl. 303—21 F** **43 Claims**

There is disclosed herein a plurality of hydraulically controlled separating valves, one for each vehicle wheel, of an antiskid control system. Each of the separating valves separates its associated wheel brake cylinder from the master cylinder when an electronic control system responsive to wheel speed sensors produces a first control value indicative of wheel skid and reconnects its associated wheel brake cylinder with the master cylinder when a further control value indicative of a given wheel reacceleration is produced by the electronic control system. A volume expansion arrangement is also provided for each of the separating valves to enable reacceleration of the wheels. All of the plurality of separating valves and volume expansion arrangements are arranged compactly in one single



housing and the separating valves are maintained open by a primary control force, such as accumulator or pump pressure, the primary control force being controlled by the control valves to provide antiskid control. Should the primary control force be lost a single auxiliary force contained in the housing will operate on all the volume expansion arrangements and/or separating valves to maintain the separating valves in their open position so that the brake system is operative even though the antiskid control system is rendered inoperative. A mechanical and a hydraulic auxiliary force arrangement is disclosed.

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**3,788,711**

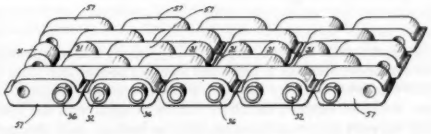
## CHAIN FOR MINING MACHINE AND THE LIKE

**Claude B. Krekeler, Cincinnati, Ohio, assignor to The Cincinnati Mine Machinery Co., Cincinnati, Ohio**

**Division of Ser. No. 85,601, Oct. 30, 1970, Pat. No. 3,679,265. This application Apr. 19, 1972, Ser. No. 245,444**

**Int. Cl. B62d** *55/20*

**U.S. Cl. 305—58** **1 Claim**



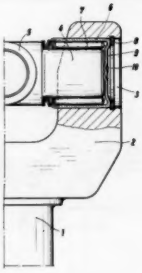
An endless chain for a mining machine or the like which can be made up to any desired length and width. In one embodiment, the chain can be made to carry cutting tools in any suitable pattern or arrangement and will comprise a plurality of standard link elements and a plurality of standard chain block elements. In another embodiment, the chain can serve as an endless tread for a self-propelled mining machine, in which instance it may be comprised of a plurality of identical, standardized link elements or it may be comprised of a plurality of standard link elements and a plurality of one or more types of modified link elements. In both embodiments, the link elements, or the link and chain block elements, will be joined together by connecting pins of appropriate lengths.

3,788,712

## BEARING BUSHING FOR UNIVERSAL JOINTS

Hans-Joachim Kohler, and Guido Rieder, both of Herzogenaurach, Germany, assignors to Industriewerk Schaffler, Herzogenaurach, Germany

Filed Apr. 24, 1972, Ser. No. 247,020
Claims priority, application Germany, May 7, 1971, P 21 22 575.2
Int. Cl. F16c 21/00, 33/34
U.S. Cl. 308—35 4 Claims



A bearing bushing for accommodating spider trunnions in bores in the shaft forks of a universal joint wherein the bushing has on one side a closed end for abutment of the end of the spider trunnion.

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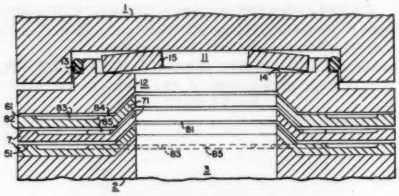
3,788,713

## HYDROSTATIC THRUST BEARING

Charles E. Kraus, Austin, Tex., assignor to Excelermatic, Inc., Rochester, N.Y.

Filed May 23, 1972, Ser. No. 256,143
Int. Cl. F16c 1/24
U.S. Cl. 308—160 18 Claims



A hydrostatic thrust bearing for supporting a load member on a support member is disclosed wherein pressurized fluid is admitted into a cavity formed between opposed surfaces of the load and support members. Lands integral with the load and support members form an annular leakage path through which the pressurized fluid is permitted to escape from the cavity, at least one annular disc being disposed between the lands thereby dividing the leakage path into at least two parallel passages.

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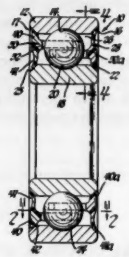
3,788,714

## BALL BEARING WITH A UNITARY SEPARATOR-SEAL

Peter A. Degioia, Sandusky, and Charles B. Sutton, Port Clinton, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed June 15, 1972, Ser. No. 263,109
Int. Cl. F16c 33/78, 33/46
U.S. Cl. 308—187.2 2 Claims

A ball bearing is completely sealed by a pair of independent unitary separator-seals. Each of the separator-seals closes one side of the annular space between the bearing races and includes a tubular separator with ball pockets which snap receive the bearing balls. Each separator-seal has a rigid seal-



ing lip which centers its respective separator-seal from one bearing race and a second thin and relatively flexible sealing lip wipingly engaging the opposite bearing race to seal one side of the bearing.

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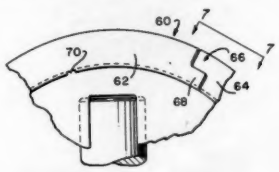
3,788,715

## BEARING ADAPTER

Richard L. Alling, Torrington, Conn., assignor to The Torrington Company, Torrington, Conn.

Filed Dec. 29, 1972, Ser. No. 319,517
Int. Cl. F16c 33/46
U.S. Cl. 308—217 7 Claims



An adapter is disclosed for changing the effective inside diameter or effective outside diameter of a bearing cage.

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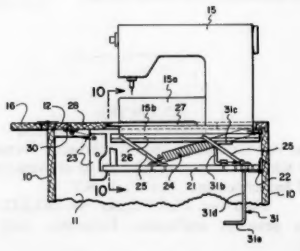
3,788,716

## WORK CABINET FOR SEWING MACHINE

Stanley D. Roberts, and Kent S. Roberts, both of American Fork, Utah, assignors to Roberts Mfg., Inc., American Fork, Utah

Filed Aug. 7, 1972, Ser. No. 278,222
Int. Cl. A47f 5/08
U.S. Cl. 312—29 10 Claims



A work cabinet, for mounting a sewing machine in different work positions and for housing the machine when not being

worked, provides a drop shelf interiorly of the cabinet below the top working surface thereof for lowering the machine into the interior of the cabinet. The drop shelf carries a mount for the machine, by means of linkage which permits raising and lowering of the machine to different work positions. Pivotally fulcrumed on the drop shelf is a lever having a work arm and a power-input arm, the former underlying the machine mount so as to raise and lower the sewing machine when power, usually manual, is applied to the latter. The cabinet is well adapted to open-arm types of sewing machines, and is provided with a removable insert for its apertured top wall as an extender for the limited work surface of such top wall in the work positions of the machine. The insert fits around the machine and closes the aperture provided in the top wall of the cabinet for enabling the machine to be lowered by means of the drop shelf.

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**3,788,717**

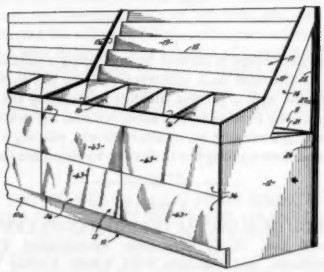
**DISPLAY FIXTURE**

**Max E. Hosmer, Charlevoix, Mich., assignor to Freedman Artcraft Engineering Corp., Charlevoix, Mich.**

**Filed July 21, 1972, Ser. No. 273,716**

**Int. Cl. A47f** *3/00*

**U.S. Cl. 312—122** **18 Claims**



A display fixture is disclosed which has a rectangular metal front frame, a pair of side walls, a brace interconnecting the side walls at the rear, and a series of drawers fitted into the front frame. The drawers are supported solely from roller brackets attached to the front frame in such a manner that the drawers are cantilevered from the brackets in both the open and closed position of the drawers. The drawers each comprise a rectangular frame of extruded elements into which are fitted bottom, side, front and rear wall boards.

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**3,788,718**

**FRAME FOR HANGING FOLDERS IN FILE CABINETS**

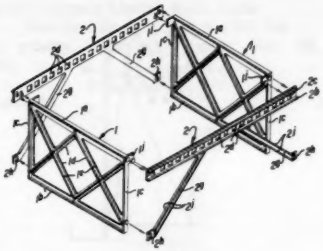
**James M. Bjorn, 69 18th Ave, South, Lake Worth, Fla., and C. Walter Johnson, 7930 W. Lake Dr., West Palm Beach, Fla.**

**Filed May 19, 1972, Ser. No. 255,174**

**Int. Cl. A47b** *63/00*

**U.S. Cl. 312—184** **3 Claims**

The frame for hanging folders in filing cabinet drawers includes a pair of spaced plastic end panels adapted to be positioned within the front and rear of the drawer. A pair of plastic side rails having a series of spaced holes therein for receiving the rods of hanging folders extend between the upper portions of the end panels at opposite sides thereof, the side rails having downwardly and outwardly diverging intergral struts terminating opposite the lower side portions of the end panels.



And quick detachable means are provided for removably connecting the overlapping ends of said side rails and struts to the end panels respectively.

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**3,788,719**

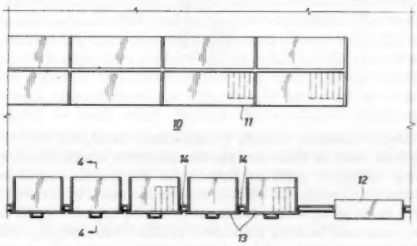
**TAPE STAGING BINS FOR DATA CENTER**

**D. E. Whited, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.**

**Filed July 18, 1972, Ser. No. 272,834**

**Int. Cl. A47b** *53/00*

**U.S. Cl. 312—198** **10 Claims**



A plurality of staging bins particularly adapted for use with magnetic computer tapes and disks wherein the tapes and disks are normally stored in a library and dispensed in response to a request. The staging bins comprise a plurality of bins pivoted at their lower edge for tape and pivoted on their side edge for disk and open on the side facing the library whereby an operator may open the bin and obtain tapes and disks placed in the bin by the librarian. The bins also include means for locking the bins when the library is unattended.

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**3,788,720**

**GARBAGE BIN**

**Walter Schneider, Unterrenggstrasse, Langnau, Zurich, Switzerland**

**Filed Jan. 10, 1972, Ser. No. 216,575**

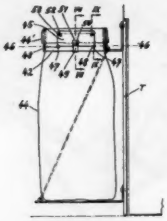
**Claims priority, application Switzerland, Mar. 12, 1971, 3680/71; May 27, 1971, 7759/71; June 7, 1971, 8264/71; Sept. 7, 1971, 13135/71**

**Int. Cl. B65d** *91/00*; **B65b** *67/04*

**U.S. Cl. 312—211** **3 Claims**

A refuse container which comprises a vertical support to which is affixed an upstanding generally rectangular frame into which the neck of a flexible refuse sack can be inserted and over the rim of which the edge of the sack is folded. At least at two opposite ends of the frame, there are provided a

pair of securing flaps pivotal toward and away from the upper portion of the frame and held in contact with the turned-over



portion of the sack by leaf springs which engage in openings of the flaps to retain them in outwardly deflected position for insertion and removal of the sack.

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3,788,721

**ELECTRICALLY CONDUCTIVE COMPONENTS**

**Arthur Samuel Vause, London, England, assignor to Thorn Electrical Industries, Limited, London, England**

**Filed July 26, 1971, Ser. No. 165,516**

**Claims priority, application Great Britain, Dec. 15, 1970, 59,567/70**

**Int. Cl. H01j 9/02**

**U.S. Cl. 316—17** **7 Claims**

Metal elements, usually of refractory metal, for electrical devices such as filaments for incandescent lamps, discharge lamp cathodes, grids or heaters for thermionic valves and radiation elements for electric heaters are made by forming an etch resist pattern on a metal web, etching the web, removing the resist and bending the etched product into compact form. The element produced has a substantially rectangular section which provides a high surface area to cross-sectional area ratio, leading to high thermal and light emission efficiency.

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3,788,722

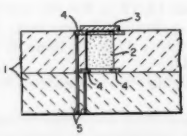
**PROCESS FOR PRODUCING A GASEOUS BREAKDOWN DISPLAY DEVICE**

**Alvin A. Milgram, Wilmington, Del., assignor to Panel Technology Inc., Wilmington, Del.**

**Continuation of Ser. No. 83,387, Oct. 23, 1970, abandoned, which is a continuation-in-part of Ser. No. 819,555, April 29, 1969, abandoned. This application Apr. 18, 1973, Ser. No. 352,471**

**Int. Cl. H01j 9/18**

**U.S. Cl. 316—19** **7 Claims**



A method for making a gaseous breakdown display device having a gas contained within a sealed volume between a transparent face and a dielectric body, said process comprising co-firing precious metal excitation electrodes and a dielectric body having a cavity, thereafter enclosing the gas in said cavity with a transparent face. The gaseous breakdown is contained by the device structure. The gaseous ions and intense heat generated by the discharge do not harm the components of the device made according to this invention because the device components are capable of operating at high temperatures in oxidizing atmospheres and are good conductors of heat. Consequently, the device can operate at high power density, which provides a high light output.

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3,788,723

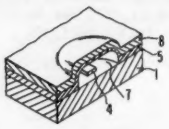
**METHOD OF PREPARING CAVITY ENVELOPES BY MEANS OF THIN-FILM PROCEDURES**

**William I. Lehrer, Los Altos, Calif., assignor to Fairchild Camera and Instrument Corporation, Syosset, Long Island, N.Y.**

**Division of Ser. No. 723,706, April 24, 1968, abandoned. This application Apr. 24, 1972, Ser. No. 70,102**

**Int. Cl. H01j 9/38**

**U.S. Cl. 316—20** **8 Claims**



A cavity envelope is formed by producing a selected shaped volume of diffusant on a substrate, coating the substrate and the diffusant with a porous dielectric, leaching the diffusant from the cavity formed by the substrate and the porous dielectric, creating a vacuum in, or alternatively, placing a gas in the cavity, and then coating the dielectric to eliminate its porosity.

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3,788,724

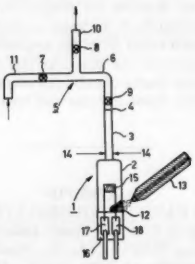
**METHOD OF MANUFACTURING GAS-FILLED LAMPS**

**Ferdinand Jose Maria Schenkels, Emmasingel, Eindhoven, Netherlands, and Ghislain Felix Alfons Arthur Verboven, Zonneweeldelaan 29, Belgium**

**Filed Dec. 7, 1971, Ser. No. 205,535**

**Int. Cl. H01j 9/38**

**U.S. Cl. 316—20** **2 Claims**



Lamps are provided with a filler gas by condensing the filler gas in the envelope and by subsequently sealing the envelope. Condensation of the filler gas is effected by spraying the envelope locally with a liquified gas so that the envelope is cooled to below the condensation temperature of the filler gas.

3,788,725

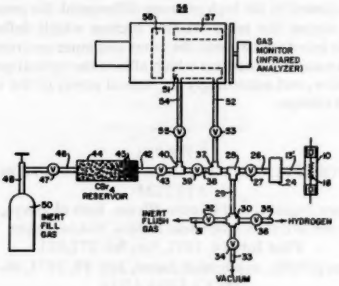
## METHOD OF DOSING AN INCANDESCENT LAMP WITH A CONTROLLED AMOUNT OF HALOGEN-CONTAINING MATERIAL

Lymperios N. Yannopoulos, and Alfred R. Pebler, both of Pittsburgh, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Division of Ser. No. 158,435, June 30, 1971, Pat. No. 3,707,643. This application June 14, 1972, Ser. No. 262,872

Int. Cl. H01j 9/38

U.S. Cl. 316—20 5 Claims




A halogen-containing material such as carbon tetrabromide is vaporized and admixed with an inert fill gas, the lamp is evacuated, and the admixed fill gas and vaporized material are introduced into the lamp. The amount of vaporized halogen-containing material in the mixture is monitored by infrared measuring techniques so that a known and carefully controlled quantity of such material is sealed within the finished lamp.

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3,788,726

## PRODUCING IMAGES OF PARTS OF AN OBJECT WHICH LIE AT DIFFERENT DEPTHS BY MEANS OF HOLOGRAPHIC TOMOGRAPHY

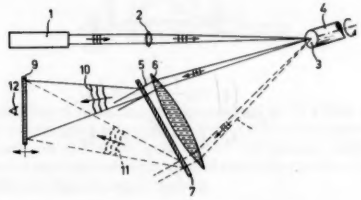
Gunther Groh, Hamburg, and Ulf Tiemens, Oldenburg, both of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 27, 1971, Ser. No. 192,823

Claims priority, application Germany, Oct. 30, 1970, 2053391

Int. Cl. G02b 27/00

U.S. Cl. 350—3.5 11 Claims



A method of, and an apparatus for, producing images of details of an object which lie at different depths by means of holographic tomography is described. The component holograms which correspond to the images of the object from different perspectives are so illuminated in time sequence that the reconstructed images are incoherently superposed on one another.

3,788,727

## OPTICAL SYSTEM OF A BINOCULAR MICROSCOPE

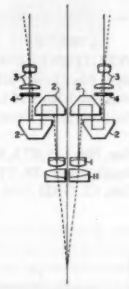
Kuniomi Abe, Nishinomiya, Japan, assignor to Konan Camera Laboratory Company Limited, Kobe, Japan

Filed Nov. 29, 1971, Ser. No. 202,748

Claims priority, application Japan, Nov. 28, 1970, 45/118282

Int. Cl. G02b 21/20

U.S. Cl. 350—36 3 Claims



The optical system includes two microscopes arranged at an angle to each other so that their optical axes intersect at an object to be observed, with each microscope including a respective main objective at its light entry end and a respective eyepiece at its light exit end. The two eyepieces are parallel to each other in a common plane so that their optical axes extend parallel to each other, and each of two eccentric objectives is positioned in front of a respective main objective and the two eccentric objectives are arranged in parallel in the same plane. The eccentric objectives redirect the diverging ray bundles, arriving thereat from the object to be observed, to extend parallel to each other through the eyepieces. Respective diaphragming rings are arranged centrally in the field of vision of each eyepiece, and each ring has a circular aperture therein eccentric to the field of vision of the associated eyepiece. The two apertures have the same eccentricity, and the two rings are relatively adjustable so that the images in both eyes coincide with each other without any conscious effort.

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3,788,728

## INCREASE IN THE TRANSMITTING INFORMATION CAPABILITIES OF WAVE IMAGE-FORMING SYSTEMS

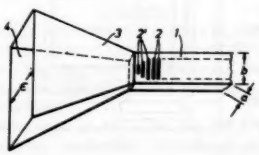
Heinrich Nassenstein, Leverkusen-Steinbuchel, and Hans-Georg Fitzky, Odenthal Hahnenberg, both of Germany, assignors to Bayer Akitengesellschaft, Leverkusen, Germany

Filed Oct. 13, 1971, Ser. No. 188,788

Claims priority, application Germany, Oct. 22, 1970, 2051851

Int. Cl. G02b 5/14

U.S. Cl. 350—96 WG 4 Claims



A process of improving the information transmitting properties when mapping images by means of waves comprising

the step of illuminating an object having a high spacial frequency spectrum $k_n$ with sub-waves having a wave number $k_s$ which has the same order of size as $k_n$, forming homogeneous waves of wave number $k_b = k_n - k_s$ by the diffraction of the sub-waves on the object. The sub-waves are produced by illuminating the entry of a periodically loaded wave guide with homogeneous waves, the vacuum wave length of which is large in comparison with the period of the wave guide load, so that the phase velocity of the homogeneous waves is retarded. The object is placed adjacent the periodic load.

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**3,788,729**

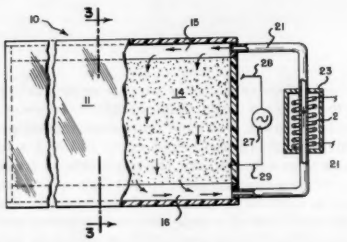
**THERMAL CONVECTION FLOW LIGHT VALVE**

**Francis C. Lowell, Roslyn; Matthew Forline, Ozone Park; Paul Rosenberg, Larchmont, and Robert L. Saxe, New York, all of N.Y., assignors to Research Frontiers, Inc., Plainview, N.Y.**

**Continuation of Ser. No. 129,873, March 31, 1971, abandoned. This application Apr. 28, 1972, Ser. No. 248,479**

**Int. Cl. G02f 1/36**

**U.S. Cl. 350—160 R** **24 Claims**




A light valve includes a cell containing a fluid capable of being acted upon by an electric or magnetic field, or both, to change the transmission of light through the fluid, and means for applying such a field thereto. Specifically described is a fluid suspension of minute particles acted upon by an electric field. An external or internal conduit connects opposite edge portions of the cell and heat is applied to the fluid in the cell or conduit to produce a thermal convection flow of the fluid through the cell and conduit.

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**3,788,730**

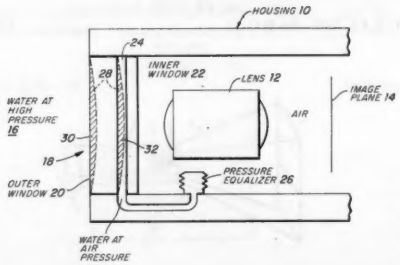
**MULTIELEMENT WINDOW**

**Allen H. Greenleaf, Lexington, Mass., assignor to Itek Corporation, Lexington, Mass.**

**Filed Mar. 29, 1972, Ser. No. 239,087**

**Int. Cl. G02b 3/12**

**U.S. Cl. 350—179** **9 Claims**




A window for separating a protected environment wherein a lens system is located from a high pressure environment, such as deep sea water, without allowing the high pressure differential across the window to change the optical power of the window and defocus the lens system. The window is constructed in a laminar fashion with a thick outer window, a thin inner window and a compensating section located between said inner and outer window sections. The compensationg section is filled with a fluid having the same index of refraction as the fluid of the high pressure environment, and is exposed to the pressure of the protected environment. This arrangement results in the entire pressure differential between the outer environment and the protected environment being placed across the thick outer window section. The fluid in the compensating section accommodates any deformation of the outer window section caused by the high pressure differential. No pressure is exerted across the inner window section which defines the water-air interface between the outer and inner environments. It is this water-air interface which affects the optical power of the window, and accordingly the optical power of the window does not change.

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**3,788,731**

**TWO POINT FOCUS VARIABLE MAGNIFICATION LENS SYSTEM**

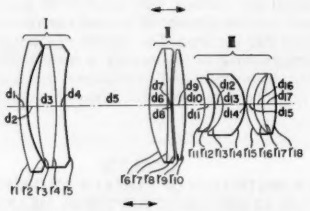
**Muneharu Sugiura, and Ryusho Hirose, both of Tokyo, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed July 14, 1972, Ser. No. 272,071**

**Claims priority, application Japan, July 19, 1971, 46/53100**

**Int. Cl. G02b 15/14**

**U.S. Cl. 350—184** **8 Claims**




A two point focus variable magnification lens system which can be focussed at two points, the minimum and maximum focal lengths with different magnifications by the movement of the only second lens groups, and which when focussed at the minimum focal length of the maximum focal length can be made to focus for an object at either of special two distances without performing the focussing operation as far as the following conditions are satisfied,

$$-\frac{1}{s_2}+\frac{1}{x+y}=\frac{1}{f_1}$$

$$|f_1|=\frac{\left(\xi_o+f_2\frac{1+K}{K}-1_n\right)s_1}{s_1+f_2\frac{1+K}{K}+\xi_o-1_n}$$

wherein $f_1$ is the focal length of the first lens group, $f_2$ is the focal length of the second lens group, $s_1$ is the distance of a special farther side of objects from the front end of the lens system in the case of the minimum focal length, $s_2$ is the distance of a special nearer side of objects from the front end of the lens system, $\xi_o$ is the displacement length of the second lens group, $K = 1/\sqrt{z}$ (z: the variation ratio of magnification), $l_n$ is the interval between the principal points of the first and second lens groups in the case of the maximum focal length, $x$

is the distance from the front principal point of the first lens group to the point of image formed of an object at a special farther side by the first lens group in the case of the minimum focal length, and $y$ is $f_2(1-K)^2/k$.

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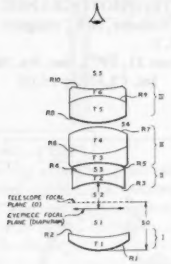
**3,788,732**
**FOUR COMPONENT MICROSCOPE EYEPIECE**
**Arthur H. Shoemaker, Aurora, N.Y., assignor to American Optical Corporation, Southbridge, Mass.**
**Filed Sept. 11, 1972, Ser. No. 288,208**
**Int. Cl. G02b** *25/00*
**U.S. Cl. 350—220** **3 Claims**



This invention relates to a microscope eyepiece having a magnification of substantially 6.3X, an apparent field of view of substantially 38.6°, and a maximum exit pupil diameter of substantially 2.56 millimeters.

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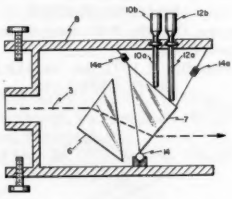
**3,788,733**
**LASER DIRECT FIRE SIMULATOR EMPLOYING REFRACTIVE MEDIA**
**Denis R. Breglia, Altamonte Springs; Windell N. Mohon, Winter Park, and Joseph F. Mulson, Maitland, all of Fla., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**
**Filed Nov. 17, 1972, Ser. No. 307,668**
**Int. Cl. G02b** *7/18*
**U.S. Cl. 350—287** **3 Claims**



Optical beam refracting means adapted to fit within a gun barrel are designed to cooperate with a laser beam generator positioned in the same gun barrel. Micrometer adjusting means are provided whereby optical elements can be adjusted to deflect the laser beam as desired.

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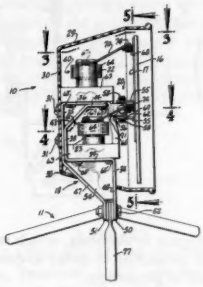
**3,788,734**
**FENDER MOUNTED REAR VIEW MIRROR**
**Paul E. McDuffee, Sr., 306 23rd Ave. West, Bradenton, Fla.**
**Filed Sept. 8, 1972, Ser. No. 287,252**
**Int. Cl. G02b** *5/08*
**U.S. Cl. 350—289** **20 Claims**

A fender mounted rear view mirror for an automotive vehicle, which is tiltingly adjusted about either of two coordinate axes in consequence of selective energization of two electric motors controlled by switches located in the driver's compartment of the vehicle. Each of the motors is drivingly connected through reduction gearing with a rotary actuating member;



and rotary motion of each actuating member is translated into tilting adjustment of the mirror about one of said axes through a pitman having one end eccentrically connected with the actuating member and its other end connected to the back of the mirror.

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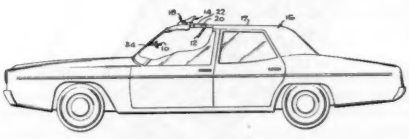
**3,788,735**
**REAR-VIEW MIRROR SYSTEM**
**David S. Rowley, 2350 Berkeley St., Salt Lake City, Utah**
**Filed May 22, 1972, Ser. No. 255,699**
**Int. Cl. G02b** *5/08*
**U.S. Cl. 350—302** **26 Claims**



Rear-view mirror system for use in a vehicle, e.g. an automobile, comprising in combination with a conventional adjustable plane rear-view mirror, an additional pair of mirrors, one of such additional mirrors being a plane mirror which faces forward, and the second additional mirror being a spherical segment facing the rear, and mounted on the roof of the automobile, a glass window being mounted in an opening in the roof of the automobile, whereby the driver may tilt his conventional rear-view mirror upward to thus view the exterior spherical mirror by reflection from the first planar additional mirror, so as to provide a wide angle view to the rear of the vehicle without having to move the eye to any greater extent than when employing a conventional rear-view mirror.

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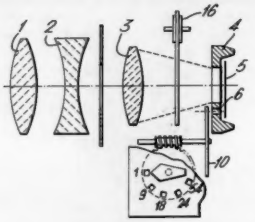
**3,788,736**
**PROCEDURE AND DEVICE FOR SYNCHRONISING CINEMATOGRAPHIC CAMERAS WITH A PROJECTOR**
**Serge Oulevay, Yverdon, and Jean Thevenaz, Grandson, both of Switzerland, assignors to Bolex International SA, Saint-Croix, Switzerland**
**Filed Sept. 15, 1972, Ser. No. 289,626**
**Claims priority, application Austria, Sept. 16, 1971, 8071/71**
**Int. Cl. G03b** *21/48*
**U.S. Cl. 352—180** **6 Claims**

A method and apparatus for synchronising the speed of filming of a cine-camera with the rate of a projector in which a

marking is made on each frame of a movie film during shooting, this marking having characteristics corresponding with a



certain image frequency in shooting, which markings can be read at the time of projection in order to control or provide control for the speed of projection.

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**3,788,737**

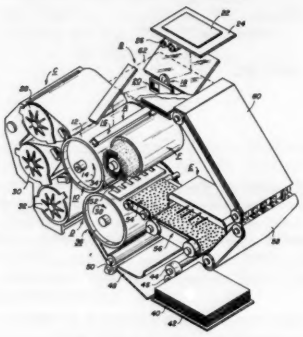
**LUMINESCENT COVER**

**Wayne L. Kidd, Fairport, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Oct. 13, 1972, Ser. No. 298,720**

**Int. Cl. G03g** *15/00*

**U.S. Cl. 355—3 R** **6 Claims**



An electrophotographic printing machine in which a platen cover is arranged to illuminate a transparent platen with an original document mounted thereon. The light rays illuminating the marginal portions of the platen extending beyond the original document are transmitted therethrough discharging the photoconductor in those regions. This prevents the development of unwanted border regions on the copy paper.

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**3,788,738**

**METHOD FOR RECORDING A VISIBLE IMAGE ON A SUBSTRATE BY USING AN ELECTROCONDUCTIVE TONER**

**Satoshi Takeuchi, Iruma District, Saitama Prefecture, and Hachiro Saito, Narashino, Chiba Prefecture, both of Japan, assignors to Dai Nippon Insatsu Kabushiki Kaisha, Tokyo, Japan**

**Filed July 25, 1969, Ser. No. 845,040**

**Claims priority, application Japan, Aug. 15, 1968, 43-58340; Aug. 15, 1968, 43-58341**

**Int. Cl. G03g** *13/14*

**U.S. Cl. 355—17** **4 Claims**

This invention relates to a method for recording a visible image by forming an electrostatic charge image or an electric field image on a photoconductive insulating layer or a dielectric layer which is disposed on a substrate or a dielectric sheet or film and connecting said electrostatic charge image or said electric field image to said visible image by contacting said electrostatic charge image or said electric field image with an electroconductive toner sprinkled on said photoconductive insulating layer or said dielectric layer or said dielectric sheet or film, thereby to form said visible image, and fixing said visible image on said photographic insulating layer or said dielectric layer or said dielectric sheet or film under heating or in the presence of a solvent vapor.

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**3,788,739**

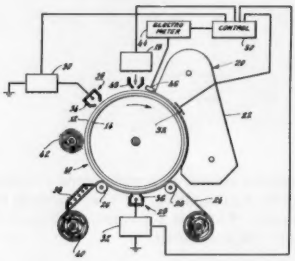
**IMAGE COMPENSATION METHOD AND APPARATUS FOR ELECTROPHOTOGRAPHIC DEVICES**

**Samuel D. Coriale, Webster, N.Y., assignor to Xerox Corporation, Rochester, N.Y.**

**Filed June 21, 1972, Ser. No. 265,101**

**Int. Cl. G03g** *13/00*

**U.S. Cl. 355—17** **7 Claims**



A compensation method and apparatus wherein an electrometer probe is positioned in proximity to an exposed area of a charged photoreceptor surface. The probe is positioned only in that position of the area which is always light struck. Measurement of the surface potential and comparison of the surface potential to a fixed reference provides a control signal which can be employed to compensate charge, exposure, transfer and development.

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**3,788,740**

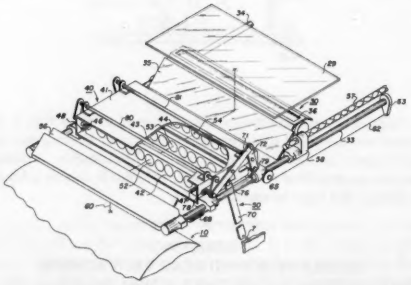
**IMAGING SYSTEM**

**David K. Shogren, Ontario, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Dec. 8, 1972, Ser. No. 313,213**

**Int. Cl. G03b** *27/50*

**U.S. Cl. 355—51** **11 Claims**



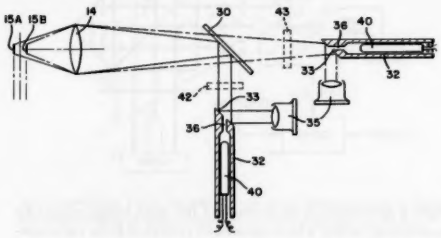
A lens strip optical system for use in a copying machine wherein the original to be copied is supported in a flat stationary condition and a flowing light image of the original is recorded upon a moving photosensitive member.

3,788,741

## DISTANCE INDICATING OPTICAL PROBE

Lester W. Buechler, Dayton, Ohio, assignor to Systems Research Laboratories, Inc., Dayton, Ohio

Filed July 26, 1972, Ser. No. 275,432
Int. Cl. G01c 3/08
U.S. Cl. 356—4 20 Claims




An optical probe for monitoring the distance to an object includes at least a pair of fiber optic bundles, each bundle having the image of its end surface focused at a plane preferably located on either side of the normal position of an object. Each fiber object bundle includes one or more fibers used as a receiver and one or more additional fibers used as light transmitters. When the image of the end of the fiber optic bundle is in focus on the object, the light observed by the receiving fiber is at a minimum. As the focus is changed, light from the transmitting fibers will increasingly cover the area observed by the receiving fibers, the intensity of the received light being a function of the out-of-focus distance. By using a pair of optical fiber bundles, the surface of which are focused at different planes, an unambiguous output may be obtained which can be converted directly into a distance measurement from the probe to an object under observation. Reflectivity of the surface of the object may be compensated for by comparing the light received by the receiving optical fibers. In one alternative embodiment, an image is formed by a single transmitter-receiver combination and the focal distance is modified by means of a high index of refraction material which is periodically interposed in the light path. In other embodiments, a beam splitter is used with two transmitter-receiver combinations and the light sources are separated by a means such as, by alternately switching the lights and detectors on and off, by light filters, or by use of polarized light.

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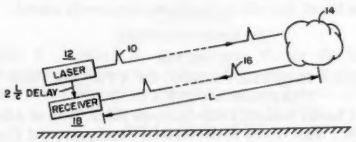
3,788,742

## GAS MONITORING SYSTEM

Max Garbuny, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed June 24, 1971, Ser. No. 156,331
Int. Cl. G01n 21/00
U.S. Cl. 356—5 10 Claims




A monochromatic laser beam tuned to a wavelength which coincides with one of the natural absorption lines of the gas molecular species to be detected is directed towards the gas medium being monitored. A remotely located receiver positioned in proximity to or near the laser system, views the radiated region of the monitored gas in two spectral regions; one in the absorption band and the other on either side of the absorption band. The receiver develops signals from the backscattered irradiation in the time and frequency domain to determine the presence and measure the density, depth and range of the molecular species being detected in the illuminated cross section of the monitored gas. A second method employed by this invention utilizes the polarization characteristics of the backscattered radiation, incurred from processes such as resonant imprisonment in the monitored gas, to determine the presence of the molecular species being detected.

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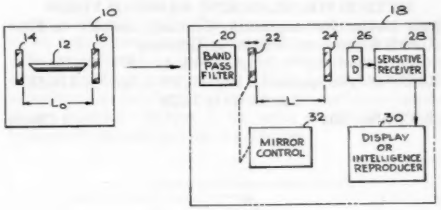
3,788,743

## LASER RECEIVER SYSTEM

Nicholas George, Pasadena, Calif., assignor to California Institute of Technology, Pasadena, Calif.

Filed Mar. 2, 1972, Ser. No. 231,186
Int. Cl. G01p 3/36
U.S. Cl. 356—28 7 Claims




A multi-tone gas laser emits light to a receiver. The receiver may be on the same vehicle as the light emitting laser, receiving light reflected from a moving vehicle, or the receiver and laser light transmitter may be moving relative to one another. Thus, the light which is received is modulated as a result of the relative vehicle motion. The receiver comprises a coarse 1 to 100 A. interference filter followed by a Fabry-Perot cavity and photo detector. The length of the Fabry-Perot cavity is chosen roughly equal to the cavity length of the transmitter laser, but with provision for fine fractional wave length control of its length. This length is adjusted until the output derived from a photodetector is peaked. A read-out of the vernier length at that time gives a measurement of the velocity. If the transmitter and receiver are relatively non-accelerating and the light transmitted is modulated then the receiver can intelligently demodulate the received signals.

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3,788,744

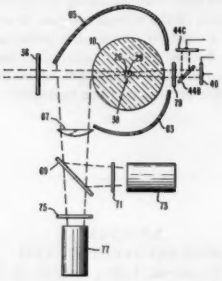
## METHOD AND APPARATUS FOR PHOTOANALYSIS

Mitchell Friedman, Yorktown Heights; Louis A. Kamentsky, Briarcliff Manor, and Isaac Klinger, Yorktown Heights, all of N.Y., assignors to Bio/Physics Systems, Inc., Katonah, N.Y.

Division of Ser. No. 2,750, Jan. 14, 1970, Pat. No. 3,687,553.
This application Dec. 6, 1971, Ser. No. 205,434
Int. Cl. G01n 33/16, 21/00
U.S. Cl. 356—39 13 Claims

A narrow beam of monochromatic light is directed through an optical chamber to intersect a thin stream of small particles to be optically analyzed, causing the particles to emit

fluorescent radiation in the presence of a significant particle characteristic to be detected. A spectral filtering element is



positioned to intercept the fluorescent particle radiation and to pass only a selected wave length to a photoresponsive pick-up element for detection thereby.

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3,788,745

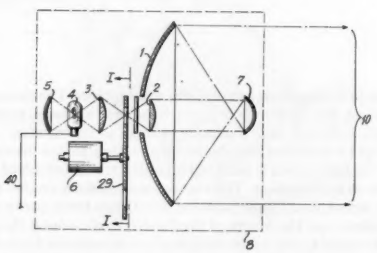
## METHOD FOR MEASURING RANGE OF VISION

Franz Menke, Neckargemund, Germany, assignor to Eltro GmbH & Company, Heidelberg, Germany

Division of Ser. No. 115,432, Feb. 16, 1971, Pat. No. 3,653,768. This application Dec. 21, 1971, Ser. No. 210,585

Int. Cl. G01n 21/26

U.S. Cl. 356—104 6 Claims



A method and apparatus is disclosed which is usable in measuring the range of vision and comprises emitting a light beam from a transmitter for reception by a distant photoelectric receiver and indication on an indicator. A diaphragm serves to alternately feed to the receiver the direct light beam from the transmitter, and the combination of the direct light beam and a dispersed beam and the intensities of the signals are compared and indicated by the indicator.

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3,788,746

## OPTICAL DILATOMETER

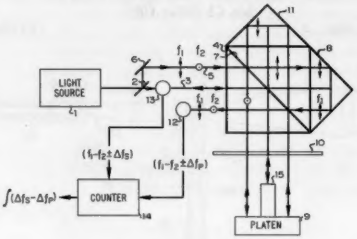
Richard R. Baldwin, Saratoga, and Bruce J. Ruff, Sunnyvale, both of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Oct. 2, 1972, Ser. No. 294,114

Int. Cl. G01b 9/02

U.S. Cl. 356—106 3 Claims

A dilatometer for measuring the linear coefficient of expansion of a specimen block wrung on a platen. The measurement is made by electronically comparing a set of fringes that are responsive to motion of the sample to a set of fringes that are responsive to motion of the platen. Each set of fringes is generated by interference between a reference light beam and a light beam which has twice traversed the distance to the surface whose motion is being monitored, the two traversals being along separate but parallel paths. Each of the two sets of




fringes is generated at the surface of the main beam splitter by recombining beams which have been reflected from cube-corners so that there is no requirement for a separate, precisely aligned, output beam splitter.

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3,788,747

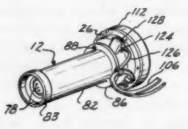
## HEADLAMP AIMING DEVICE HAVING A PROTECTIVE HOUSING

Selim R. Rahme, St. Clair Shores, Mich., assignor to A-OK Machine and Tool Company, Fraser, Mich.

Filed May 30, 1972, Ser. No. 257,687

Int. Cl. G01b 11/26

U.S. Cl. 356—121 9 Claims



A headlamp aiming device for properly aiming the headlamps of a vehicle. The device has a base member with a projection tube extending from one side thereof and concentrically arranged within a protective housing which, in turn, is connected to the base member by a plurality of circumferentially spaced shock absorbing spring assembly. A vacuum suction cup is carried on the opposite face of the base member. The base member carries an adapter ring which has means cooperating with the vehicle headlamp to permit a predetermined alignment between the headlamp and the device when the same is releasably attached to the headlamp by the action of the vacuum suction cup. A beam of light projected through the projection tube of the device strikes a target and when the beam of light has been adjusted to center on the target by the adjustment of the mounting screws on the headlamp bezel, the vehicle headlamp is properly aimed.

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3,788,748

## INDICATING THE PASSING OF A PROJECTILE THROUGH AN AREA IN SPACE

Lindsay Charles Knight; Colin Maxwell Finch, both of Albury, N. S. W.; Noel Harry Fred Walden, Southport, and George Racz, Albury, N. S. W., all of Australia, assignors to Australasian Training Aids Proprietor Limited, Albury, New South Wales, Australia

Filed Jan. 20, 1972, Ser. No. 219,366

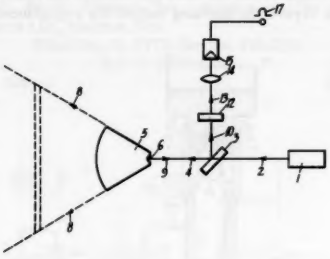
Claims priority, application Australia, Jan. 21, 1971, 3775

Int. Cl. G01b 11/26

U.S. Cl. 356—141 29 Claims

A method of and apparatus for indicating the passing of a projectile through an area in space comprising inciding the

whole of said area with a projectile light beam and detecting a reflection of said beam off a projectile passing through said



area resulting from incidence of said beam thereon thereby determining that said projectile passed through said area.

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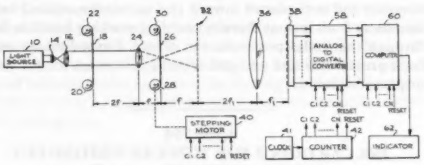
**3,788,749**
**IMAGE QUALITY RATING SYSTEM**
**Nicholas George, 4097 Robin Hill Rd., Pasadena, Calif.**
**Filed Mar. 13, 1972, Ser. No. 234,191**
**Int. Cl. G01n** *21/16;* **G06k** *9/08*
**U.S. Cl. 356—239** **8 Claims**



The sharpness of definition of an image on film may be automatically determined by comparing an original image on film with a perturbation of the same image formed from the original image. Such perturbation is achieved by using a hologram deblurring filter upon which the original image is projected. A photodetector is used to measure the power spectral density first of the original image, then of the deblurred image. As one criterion of the evaluation, the readings from the photodetector are compared and if the original image has a lower amount of high frequency content that the deblurred image then the original image is not a sharp image. If the original image has a substantially larger amount of high frequency content that the deblurred image then the original image is a sharp image.

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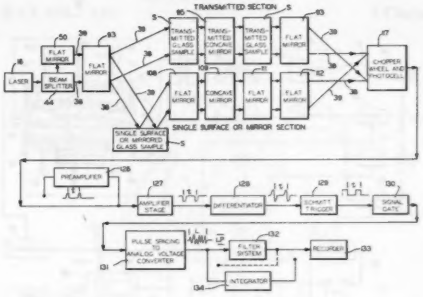
**3,788,750**
**INSPECTING GLASS**
**Robert E. Maltby, Jr., Perrysburg; Walter D. McComb, Oregon, and Richard D. Schave, Perrysburg, all of Ohio, assignors to Libbey-Owens-Ford Company, Toledo, Ohio**
**Filed Dec. 6, 1972, Ser. No. 312,785**
**Int. Cl. G01n** *21/32*
**U.S. Cl. 356—239** **27 Claims**

Inspection of flat glass or other transparent or reflecting material for vision distortion or optical quality by observing the lens power and width of positive and negative lenses on the surface or surfaces of the material. Two accurately spaced beams of light are directed toward the glass or other material being inspected, and the beams are then directed from the material to a chopper device. A photocell in the chopper device produces an electrical signal of two pulses separated in time by an amount proportional to the spacing between the beams as they arrive at the chopper. The spacing of the beams at the chopper changes in proportion to the reciprocal of the focal length of the lenses on the surface or surfaces of the sample, with a positive or convex lens causing the beams to converge and a negative or concave lens causing them to diverge



upon leaving the sample. This causes a corresponding change in the time separation of the pulses from the photocell. The pulses are suitably electronically processed and the resulting signal is graphically recorded on a strip chart as an indication of position and focal length of lenses on the surface or surfaces of the material. Changes in the index of refraction within transparent material may also be detected.

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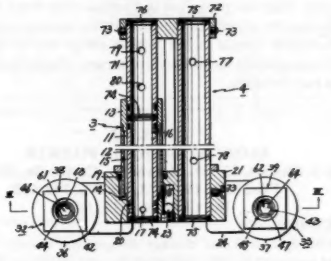
**3,788,751**
**GAS ANALYZER**
**Toshio Shimazaki; Fumio Tanei, and Yoshio Yanagida, all of Kyoto, Japan, assignors to Horiba Ltd., Kyoto-Fu, Japan**
**Filed Aug. 31, 1971, Ser. No. 176,660**
**Int. Cl. G01n** *1/10*
**U.S. Cl. 356—246** **5 Claims**

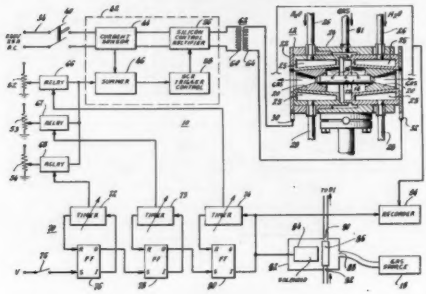


A gas analyzer comprising a sample cell adapted to receive a gas to be analyzed and a reference cell for receiving a gas to be compared, both of which are disposed between a source of light and a detector, and clamping members for clamping together a protective casing and a common cell base for support of said sample and reference cells. Other advantages and details of the arrangement will be made clear.

## 3,788,752
## GAS FLOW CONTROLLER FOR A HEATED SAMPLE CELL

Sabina Slavin, Ridgefield, and Herbert L. Kahn, Westport, both of Conn., assignors to The-Perkin-Elmer Corporation, Norwalk, Conn.

Filed Mar. 3, 1972, Ser. No. 231,578
Int. Cl. G01j 3/02
U.S. Cl. 356—36 7 Claims



A gas flow controller controls the flow of inert purging gas to a heated graphite tube sample cell. The graphite tube is electrically heated to atomize the sample so that an atomic absorption spectrophotometric measurement can be made of the sample. The purge gas is applied to the sample cell to keep oxygen out of the graphite tube to prevent burning of the tube during the heating cycle. The gas flow controller includes a valve that exhibits first and second operating positions for providing respectively a first flowpath to couple the purging gas to the sample cell, and a second flowpath to divert the gas away from the sample cell. A programmer is included in the controller to program the heating of the sample cell to a first level to dry the sample in the sample cell during a drying portion of the heating cycle. The sample cell is heated to a second level to char the sample and then to a third higher level to atomize the sample during an atomizing portion of the heating cycle. The programmer is coupled to activate the valve to switch the valve from operating in its first position during the drying and charring portions of the heating cycle to operate in its second position at the beginning of the atomizing portion of the cycle. Thus the purge gas is diverted away from the sample cell during the atomizing portion of the heating cycle so that the atomized sample is not rapidly swept out of the sample cell. Consequently more sensitive atomic absorption measurements may be made.

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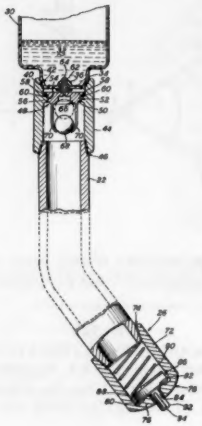
## 3,788,753
## ELONGATED LIQUID MARKER

Stanly J. Stewart, 230 W. Monroe St., Carlinville, Ill.

Filed Mar. 19, 1973, Ser. No. 342,472
Int. Cl. B43k 5/16, 1/06
U.S. Cl. 401—134 6 Claims

An elongated liquid marker comprising a bent tube body having opposed handle and marking end portions. The handle end portion has a liquid-tight threaded connection with a disposable liquid ink or dye cartridge container providing an enlarged, bulb-like axial extension which can easily be grasped and held by the user. An important feature in a marker of this kind is a gravity type check valve in the handle end portion which prevents loss of marking liquid from the tube when the handle end portion is lowered, yet enables unimpeded flow from the cartridge through an inlet port into the tube when the handle end portion is elevated. The marking end portion has a transverse end wall with a rounded, external marking surface and an internal annular seat around a central outlet port which extends through the end wall. A normally closed control valve disc is pressed against the seat by an internal spring. An actuator rod extends from the valve disc through the outlet port and projects beyond the marking surface for engagement with an object to be marked. When pressed against such an object, the actuator rod is displaced inward and moves the control valve disc away from its seat thereby enabling marking liquid to flow through the outlet port onto the object. Embodiments using both pressurized and non-pressurized containers for the hand grip are disclosed.



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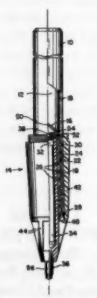
## 3,788,754
## INK CARTRIDGE FOR TUBULAR WRITING PEN

Stefan Glasa, 43 Goethestr., Wedel/Holstein, Germany

Filed Apr. 5, 1973, Ser. No. 348,345
Claims priority, application Germany, Apr. 7, 1972, 2216706
Int. Cl. B43k 1/06
U.S. Cl. 401—135 13 Claims



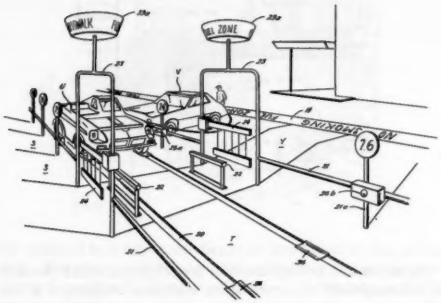
The invention relates to an ink cartridge adapted to be connected to the tip of a tubular point pen, the ink reservoir of which is provided, at the end facing the tip of the tubular point pen, with a transverse wall which is adapted to be broken open on connection to the tip of the pen, and beyond which the outer wall enclosing the ink reservoir projects forward to form a connection region.

3,788,755

## SAFETY ZONE FUEL SYSTEM FOR MOBILE DIRECT SERVICE UNITS

Delles T. Davis, Abilene, Tex., assignor to Development Research Ltd., Houston, Tex.

Filed Oct. 21, 1971, Ser. No. 191,223
Int. Cl. E01c *1/00*
U.S. Cl. 404—1 8 Claims



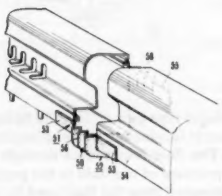
A safety zone fuel system for servicing motor vehicles with a mobile direct service unit from a barrier protected service area within the boundary marked safety zone. In one embodiment a fueling lane service area enables the mobile direct service unit to move along the fueling lane for servicing a plurality of vehicles parked adjacent the fueling lane while automatically movable barrier sections allow pedestrain traffic to cross the fueling lane.

3,788,756

## CURB AND DRAIN UNIT

Sinzo Ito, 359 Kayigaya-cho, Totsuka-ku, Yokohama-city, Japan

Filed Oct. 5, 1971, Ser. No. 186,706
Claims priority, application Japan, Jan. 31, 1971, 46/3872
Int. Cl. E01c *11/22*
U.S. Cl. 404—4 4 Claims



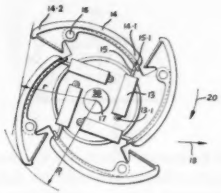
A curb and drain unit for roads which being installed on the both sides and/or the central reserve of highways or any other roads to prevent the automobile from running off the road and to drain water and slops from the road, and consisting of an upper curb portion to receive the tire of an automobile and a lower hollow portion for the drainage. Said curb portion of the unit is, in practice, provided by forming an inclined front face or a projected face on the upper half of said unit, and said drain is provided on the lower half of said unit to form a passage for drainage.

3,788,757

## IMPACT ROLLER APPARATUS

Aubrey Ralph Berrange, Brooklyn, Pretoria, South Africa, assignor to South African Inventions Development Corporation, Pretoria, South Africa

Filed Jan. 27, 1971, Ser. No. 110,147
Claims priority, application South Africa, Feb. 5, 1970, 70813
Int. Cl. E01c *19/26*
U.S. Cl. 404—124 5 Claims



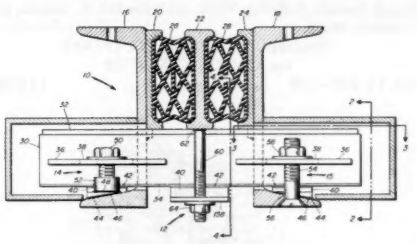
The invention provides an impact roller in which its cross-sectional profile is deformable to permit variation of the lift of the centre of gravity of the roller. Thereby the impact delivered by the roller to underlying soils and gravels may be varied.

3,788,758

## HOLD-DOWN ASSEMBLY FOR MODULAR EXPANSION JOINTS

Carl W. Scheffel, Ellicott City, Md., assignor to Fox Industries, Inc., Baltimore, Md.

Filed Apr. 7, 1972, Ser. No. 241,990
Int. Cl. E01c *11/10*
U.S. Cl. 404—56 8 Claims



A new and improved hold-down assembly is provided for attachment to modular expansion joints. These expansion joints are used to connect sections of bridge roadways.

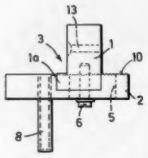
The hold-down assemblies secure the joint in such a manner as to allow for movement due to expansion, contraction, and rotation and additionally eliminate the noise produced by the joint which is generated by the traffic flow.

The hold-down assembly consists of a thin strip of stainless steel which is bonded to the underside of a supporting bar for the joint. The supporting bar makes contact with a plurality of fabric reinforced elastomeric pads topped wtih thin sheets of teflon. The hold-down assemblies are attached to the joints members by means of welded flanges and appropriate hardware.

### 3,788,759
### BORING DEVICE TO FASTEN HINGE FRAMES OR THE LIKE

Hellmuth Grunert, Hoffnungsthal Bezirk, Cologne, Germany, assignor to Prameta Prazisionsmetall - und Kunstsloffer-zeugnisse G. Baumann & Co., Cologne, Germany

Filed May 12, 1972, Ser. No. 252,689
Claims priority, application Germany, May 18, 1971, 7119368
Int. Cl. B23b 47/28
U.S. Cl. 408—115 5 Claims

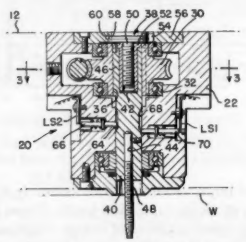



A boring device for locating and drilling hinge mounting holes in frame and door members includes a base member with a stop shoulder for positioning the device with respect to the edge of the frame member. A slide member positionally adjustable within a channel in the base member is secured to the base member. The slide member includes at least one bore jig for properly aligning a bit during drilling of one or more mounting holes. Transverse interfitting grooves between the mating surfaces of the base and slide members in conjunction with a screw and slot arrangement in the slide member provide a rigid yet adjustable mounting arrangement between the two elements. Graduated indicia on the base member and a positioning index on the slide member permit the two members to be adjusted with respect to each other for accurate positioning of the bore jig and repositioning of the members.

### 3,788,760
### TAPPING HEAD FOR PUNCH PRESS

Dennis Daniels, Bellevue, Wash., assignor to U.S. Amada, Ltd., Seattle, Wash.

Filed Sept. 13, 1971, Ser. No. 179,952
Int. Cl. B23b 47/04, 47/18
U.S. Cl. 408—130 14 Claims

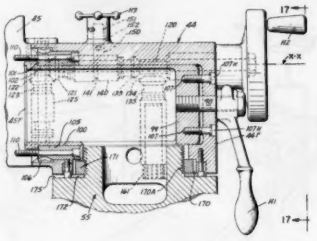



A unitized tapping head is incorporated into the turret of a multiple-tool punch press. The tapping head includes a unique replaceable cartridge which houses a tap and a feed lead screw. A self-contained drive unit rotates the cartridge to advance the tap at the same lead as the threads on the feed lead screw. The cartridge is held only by a simple spring clip and thus is easily replaced with the same or a different combination tap and corresponding feed lead screw.

### 3,788,761
### MACHINE TOOL WITH ANGULARLY ADJUSTABLE TOOL HEAD

Bob J. Langenbach, Athens, Ohio, assignor to Abex Corporation, New York, N.Y.

Division of Ser. No. 752,200, Aug. 13, 1968, Pat. No. 3,584,524. This application July 14, 1970, Ser. No. 62,735
Int. Cl. B23b 39/12, 39/14
U.S. Cl. 408—236 2 Claims

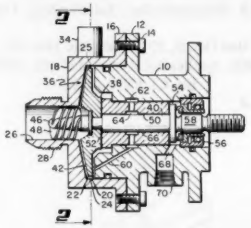


An automatic drilling machine is afforded in which the drill is automatically retracted when excessive resistance is encountered, and upon retraction may be automatically cleaned, lubricated and cooled. At no time is more than one-half the length of the drill unsupported.

### 3,788,762
### SELF-LUBRICATED PUMP WITH MEANS FOR LUBRICANT PURIFICATION

Stephen E. Partos, Mamaroneck, N.Y., assignor to Avco Corporation, Stratford, Conn.

Filed Feb. 22, 1972, Ser. No. 228,162
Int. Cl. F04d 17/06, 29/08
U.S. Cl. 415—74 3 Claims




In a centrifugal-type pump, the fluid being pressurized is extracted for use in lubricating a sleeve bearing that journals the pump rotor. The fluid is extracted through a passage exposed to the static pressure of the fluid in the pump so that contaminants are eliminated from the fluid used for lubrication.

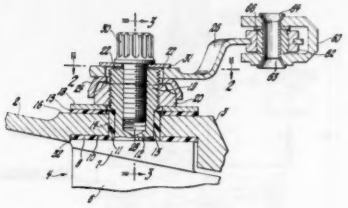
### 3,788,763
### VARIABLE VANES

Lawrence H. Nickles, Indianapolis, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed Nov. 1, 1972, Ser. No. 302,746
Int. Cl. F04d 29/52, 27/00
U.S. Cl. 415—147 4 Claims

An annular cascade of variable setting vanes in a compressor includes an annular row of vanes extending inward from the case and mounted on shafts extending through the case,

each vane having a disk engaging the case through a bushing. Additional bushings are provided between the shaft and the case and on the exterior of the case. A washer bearing against the exterior bushing is held by a nut threaded onto the shaft and the nut is retained against rotation by a locking cup washer interlocked rotatively with the shaft. The washer and a vane actuating arm also interlocked rotatively with the shaft



are retained by a cap screw threaded into the outer end of the shaft. The interior of the case preferably has a circumferential recess to receive the interior bushings of all the vanes and the interior bushing for each vane is preferably of generally rectangular outline and of varying thickness to accord with the varying spacing between the disk and the cylindrical or conical interior surface of the recess.

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**3,788,764**

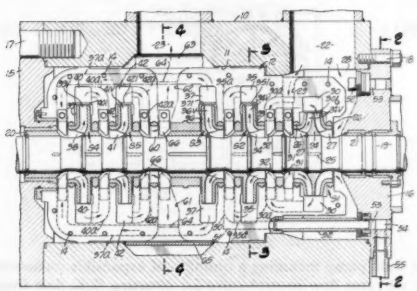
## MULTI-STAGE CENTRIFUGAL PUMP WITH MEANS FOR PULSE CANCELLATION

**Scott James Shuey, Fullerton; Wallace Leland Smith, Santa Ana, and Harold G. Wilk, Los Angeles, all of Calif., assignors to Borg-Warner Corporation, Chicago, Ill.**

**Filed Nov. 6, 1972, Ser. No. 303,891**

**Int. Cl. F01d** *1/02*

**U.S. Cl. 415—198** **11 Claims**



A multi-stage, double volute, centrifugal pump has an intermediate discharge and a final discharge constructed so that the pulses in the fluid at the discharge stages created by the impeller vanes passing the lips of the volute are eliminated within the pump assembly by the use of an impeller having an odd number of vanes and the volute lips are located 180° apart, and separate flow paths of equal length lead from each lip to a zone of confluence. The point of convergence for the intermediate discharge is in the pump case, the point of convergence for the final discharge is also in the pump case.

**3,788,765**

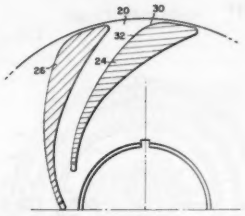
## LOW SPECIFIC SPEED COMPRESSOR

**Vasil Rusak, Somerset, N.J., assignor to De Laval Turbine Inc., Trenton, N.J.**

**Filed Nov. 18, 1971, Ser. No. 200,095**

**Int. Cl. F04d** *7/00, 17/00*

**U.S. Cl. 415—213** **2 Claims**




Wedge-type vanes, or vanes with increasing thickness from inlet to exit facilitate the layout of aerodynamically favorable flow channels in application to small diameter low specific speed compressor wheels. The channels may have various cross sections including rectangular, square, oval or circular. The channels may be backwardly bent, straight, or s-shaped in form. Streamlining the pressure side of the vanes at the exit helps to reduce exit wake losses. A local restriction may be provided in the channel axial width at the exit to correct for the area increase created by the streamlining at the exit. An extension at the trailing side of the exit to follow the shape of the streamlined pressure side of the following vane may be provided for better control of the channel exit area and better direction of the flow.

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**3,788,766**

## RING CANAL BLOWER

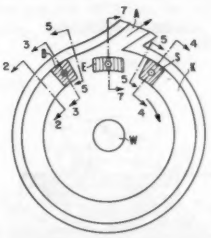
**Heinrich Engels, Nurnberg-Eibach, Germany, assignor to Siemens Aktiengesellschaft, Munchen, Germany**

**Filed June 12, 1972, Ser. No. 261,613**

**Claims priority, application Germany, June 26, 1971, 2131952**

**Int. Cl. F04d** *17/00, 17/10*

**U.S. Cl. 415—53 T** **5 Claims**



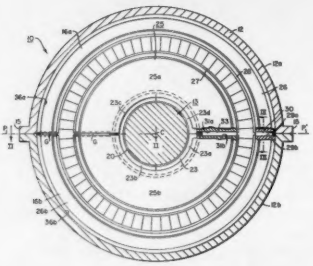
The ring canal blower has a housing with a lateral canal in front of one or both front sides of a rotor for compressing gases as well as intake and pressure connection stubs which are connected directly to each other via the canal or canals. In order to prevent a heat build-up, the housing has an outlet for hot gas located between the intake and pressure connection stubs as viewed in the direction of rotation of the rotor as well as an inlet for cool gas. The inlet for the cool gas communicates with the hot gas outlet via the rotor compartments that pass by. The outlet and inlet serve to draw off the hot gas disposed within the rotor blade compartments while replenishing these compartments with cool gas.

3,788,767

## TWO-PIECE BLADED DIAPHRAGM FOR AN AXIAL FLOW MACHINE

Julian F. Bednarczyk, San Jose, and James M. Gate, Saratoga, both of Calif., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Dec. 1, 1971, Ser. No. 203,817
Int. Cl. F01d 9/00
U.S. Cl. 415—217 9 Claims



A disc shaped bladed diaphragm structure for an axial flow turbine or compressor divided into two semicircular halves with radial grooves of mating cylindrical cross-sectional shape and having one or more cylindrical keying members disposed therein to provide a fluid seal thereacross; and a method of making a diaphragm with the seal structure described above.

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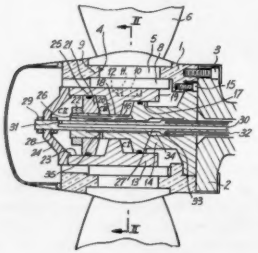
3,788,768

## FACILITY FOR CONTROLLING THE ORIENTATION OF VARIABLE-PITCH SCREW BLADES

Joseph Prampart, Nantes, France, assignor to Societe Financiere Et Industrielle Des Ateliers Et Chantiers De Bretagne and Prairie au Duc, Nantes Laire Atlantique, France

Filed Mar. 24, 1972, Ser. No. 237,640
Claims priority, application France, Sept. 17, 1971, 7133561
Int. Cl. B63h 1/06
U.S. Cl. 416—157 4 Claims



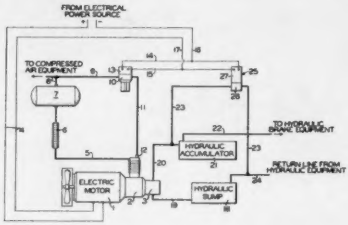
A device for orienting the blades of a variable pitch screw comprises a double acting actuator which produces a greater force in one sense than the other.

3,788,769

## COMBINED AIR AND HYDRAULIC FLUID SUPPLY APPARATUS AND CONTROL THEREFOR

William H. Glass, and Robert J. Bridigum, both of Pittsburgh, Pa., assignors to Westinghouse Air Brake Company, Wilmerding, Pa.

Filed June 23, 1972, Ser. No. 265,618
Int. Cl. F04b 49/00
U.S. Cl. 417—26 1 Claim




Combined compressed air and hydraulic fluid supply apparatus including an air compressor and a hydraulic pump driven by common driving means, such as an electric motor. A single electrical circuit for the motor is opened or closed by a pair of switch devices interposed therein in parallel relation, said switch devices being operable to open or close the motor circuit in accordance with the demand of compressed air and/or hydraulic fluid, respectively.

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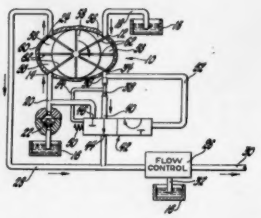
3,788,770

## FLUID PUMP WITH FLOW CONTROL MEANS

David E. Johnson, and Frederick Rehfeld, both of Saginaw, Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed June 15, 1972, Ser. No. 263,167
Int. Cl. F04b 23/04; F04c 23/00
U.S. Cl. 417—62 4 Claims




A fluid pump including a plurality of expansible chambers and a bypass flow control valve for directing fluid flow from the outlet of selected chambers to the inlet of the other chambers when the output flow of all the pump chambers is above a predetermined value.

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3,788,771

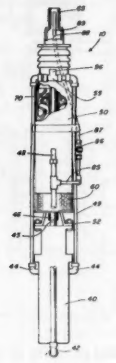
## SUBMERSIBLE PUMP

Herbert J. Akins, Sr., 322 E. Boundary St., Ely, Minn.

Filed July 7, 1972, Ser. No. 269,836
Int. Cl. F04b 23/04
U.S. Cl. 417—88 4 Claims

This invention relates to a submersible pump which combines a pneumatic motor with an elongated cylindrical pump body having a vane type structure therein driven by the motor.

The outlet of the pump receives a portion of the supply air bled off at the intake side of the motor and directed to the outlet of the pump to provide a jet action increasing pumping efficiency. The exhaust air from the motor is also directed to the outlet side of the pump to further assist the pump by providing an air pressure source to the water column moved by the pump.



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**3,788,772**

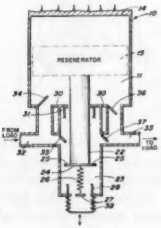
**ENERGY CONVERTER TO POWER CIRCULATORY SUPPORT SYSTEMS**

**Jack E. Noble, Benton City, and Richard P. Johnston, Kennewick, both of Wash., assignors to The United States of America as represented by the Secretary, Department of Health, Education and Welfare, Washington, D.C.**

**Filed Mar. 4, 1971, Ser. No. 121,069**

**Int. Cl. F04b** *19/24*

**U.S. Cl. 417—207** **9 Claims**




An energy converter of the Stirling cycle engine type to function as a power source for an artificial heart. The engine is designed to produce 1 to 10W to a blood pump operating at 60 to 150 pulses per minute. The simplified Stirling type engine includes a moving regenerator which is operated by pneumatic power produced within the engine itself made possible by the drive chamber, drive piston, and novel arrangement of springs and valves which maintain the engine chamber at a constant volume during compression and decompression, thereby, increasing engine output.

**3,788,773**

**HYDRAULIC CONTROL AND REGULATING APPARATUS FOR AN ADJUSTABLE PUMP**

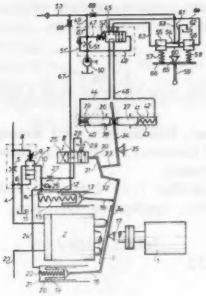
**Hans-Jurgen Van der Kolk, Sersheim, Germany, assignor to Robert Bosch GmbH, Stuttgart, Germany**

**Filed Aug. 18, 1972, Ser. No. 281,727**

**Claims priority, application Germany, Aug. 20, 1971, 2141724**

**Int. Cl. F04b** *49/00*

**U.S. Cl. 417—213** **11 Claims**



A hydraulic control and regulating apparatus for an adjustable pump driven by a prime mover, preferably a combustion motor, in which an auxiliary pump delivers fluid through a throttle producing at a predetermined speed of the auxiliary pump corresponding to the speed of the motor, a pressure differential operating a control valve to supply to, and discharge from, hydraulic setting motors which operate a manual lever controlling the position of the volume regulator of the adjustable pump. The flow of fluid to the hydraulic setting motor is controlled by a manually operated lever shifting two reversing valves for connecting the speed control valve with the delivery conduit of the auxiliary pump and with an open low pressure space.

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**3,788,774**

**POWER OUTPUT REGULATED PUMP ARRANGEMENT**

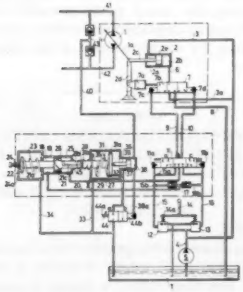
**Helmuth Roesslein, Lohr/Main, Germany, assignor to G. L. Rexroth GmbH, Lohr/Main, Germany**

**Filed Jan. 10, 1973, Ser. No. 322,516**

**Claims priority, application Germany, Jan. 11, 1972, 2201046**

**Int. Cl. F04b** *49/00*

**U.S. Cl. 417—218** **12 Claims**



An adjustable main pump whose output volume is controlled by a servomotor operated by an auxilliary pump con-

trolled by control valves, is provided with pressure regulating cylinder and piston means receiving fluid from the auxilliary pump and supplying fluid to the servomotor through the control valves. A pressure responsive piston is controlled by high pressure fluid from the outlet of the adjustable main pump, and acts on the regulating piston, forming a variable throttle therewith for controlling the flow from the regulating cylinder to a low pressure discharge conduit, or to the servomotor, depending on the pressure exerted by the pressure responsive piston on the regulating piston, so that the product of pump pressure and pumped volume, representing the power output of the main pump, remains constant during regulating movement of the pressure responsive piston.

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**3,788,775**

## REGULATING APPARATUS FOR A HYDROSTATIC PUMP

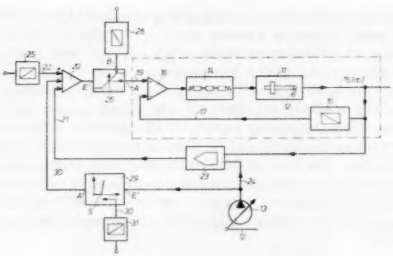
**Volkmar Leutner, Hemmingen, and Roman Romes, Friolzheim, both of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany**

**Filed Mar. 7, 1972, Ser. No. 232,477**

**Claims priority, application Germany, Mar. 10, 1971, 2111359**

**Int. Cl. F04b** *1/26*

**U.S. Cl. 417—222** **9 Claims**



A regulating apparatus for a pump having adjusting means whose actual position, represented by a differential pressure control signal, is compared with a desired position in a first differential amplifier whose output signal controls a servo valve and a force amplifier to move the adjusting means to the desired position. The control signal representing the desired position is obtained from a second amplifier which compares a signal representing a desired power output with a signal representing the actual power output, obtained from a power output measuring device multiplying a differential pressure signal representing the actual pump pressure with a signal representing the actual displacement volume derived by measuring means from the actual position of the adjusting means of the pump.

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**3,788,776**

## COMPRESSOR UNLOADING CONTROL

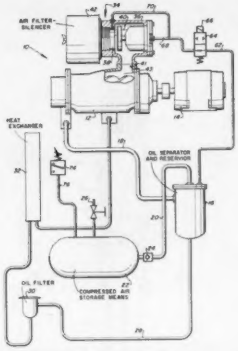
**Roger L. Post, and Michael G. Herschler, both of Quincy, Ill., assignors to Gardner-Denver Company, Quincy, Ill.**

**Filed Aug. 10, 1972, Ser. No. 279,408**

**Int. Cl. F04b** *49/02*

**U.S. Cl. 417—295** **7 Claims**

An unloading control arrangement for a liquid injected air compressor of the type which includes a pneumatically operated inlet throttling valve, a liquid separator-reservoir tank, and compressed air storage means. A pressure responsive switch connected to the compressed air storage means is operative, at a predetermined pressure condition, to actuate a single power operated valve which vents the separator-reservoir tank and causes the inlet throttling valve to reduce inlet air flow to the compressor. A vent line connected to the power operated valve includes a flow restrictor of suitable size to




provide for a low residual pressure in the reservoir tank to insure adequate liquid circulation during compressor unloaded operation.

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**3,788,777**

## MINIATURE ELECTRIC FAN

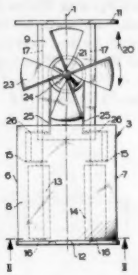
**Roland Fichter, Villingen, Schwarzwald, Germany, assignor to Firma Fichter KG, Villingen/Schw., Germany**

**Filed June 29, 1972, Ser. No. 267,511**

**Claims priority, application Germany, Feb. 2, 1972, 2204807**

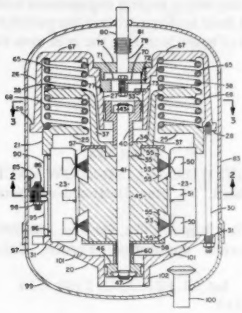
**Int. Cl. F04b** *35/00*

**U.S. Cl. 417—411** **10 Claims**



A battery-operated miniature motor is mounted on a holder forming part of a pocket size housing, the holder being extendable from the housing, and a fan is secured to the rotor shaft of the motor. Batteries in the housing are electrically connected to the motor upon extension of the holder from the housing. In one embodiment of the invention, the holder comprises a slide forming the narrow wall of a trapezoid cross-section housing, this wall being movable relative to the other walls and carrying one of the end walls of the housing. In another embodiment of the invention, the holder is again the narrower base wall of a trapezoid cross-section housing, and the housing is divided into two sections with the two sections being hinged to the side edges of the holder so that they may be swung back to expose the motor and the fan. In a further embodiment, the housing includes a cup-shaped base and a similar shaped cover hinged thereto, and the holder is a partition hinged to the base and swingable up into a position engaging the free edge of the cover when the latter is open.

**3,788,778**
**ELECTRODYNAMIC LINEAR MOTOR OPERATED GAS COMPRESSOR**
**Kenneth H. Miller, Syracuse, N.Y., assignor to Carrier Corporation, Syracuse, N.Y.**
**Filed June 30, 1972, Ser. No. 267,745**
**Int. Cl. F04b** *17/04*
**U.S. Cl. 417—417** **2 Claims**



The resilient armature centering mechanism surrounds the compressor cylinder rather than being positioned in axial series with the armature and cylinder structure. This arrangement results in a particularly compact structure for use as a hermetic refrigerator compressor.

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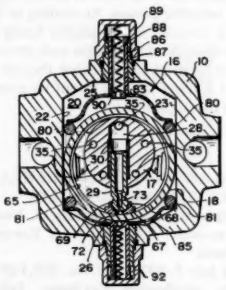
**3,788,779**
**RADIAL PISTON PUMP**
**Floyd E. Carlson, 4504 Lanewood Cir., Rockford, Ill.**
**Filed May 27, 1971, Ser. No. 147,443**
**Int. Cl. F04b** *29/00*
**U.S. Cl. 417—462** **15 Claims**



A radial piston pump or motor including an elongated rotary cylinder block having axially and angularly spaced fluid cylinders extending through the axis of rotation, with axial porting provided to opposite ends of the cylinder block for flow to and from the cylinders through stationary valve plates communicating with a common inlet manifold and a common outlet manifold. The cylinders have reciprocable pistons with universal bearing slippers engaging separate cam tracks in a surrounding cam ring. Each cam track has as a spherical cam surface with a center on the center line of the cam ring and offset from the axis of the associated piston, and the bearing slipper has a mating surface. Displacement is variable by application of fluid under pressure to opposite sides of the ring.

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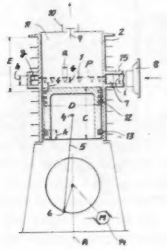
**3,788,780**
**INTAKE-VALVE-FREE COMPRESSOR**
**Włodzimierz Chomczyk, and Włodzimierz Chilimoniuk, both of Bialystok, Poland, assignors to Wyzsza Szkola Inzynierska, Bialystok, Poland**
**Continuation-in-part of Ser. No. 877,963, Nov. 19, 1969. This application July 7, 1972, Ser. No. 269,776**
**Claims priority, application Poland, Nov. 22, 1968, 130193**
**Int. Cl. F04b** *7/04*
**U.S. Cl. 417—493** **1 Claim**



A compressor cylinder is provided, along its outer periphery, with an annular supply channel for a working fluid, this channel communicating with the interior of the cylinder via a multiplicity of triangular ports lying in the path of reciprocation of the piston. The cylinder head carries an outlet with a check valve which closes during the suction stroke so that a partial vacuum is created inside the cylinder until the piston clears the ports to aspirate the fluid; upon the subsequent return stroke, the fluid is discharged through the outlet past the check valve.

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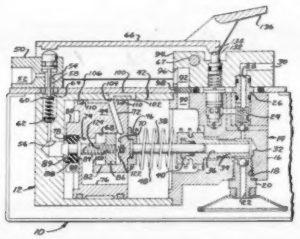
**3,788,781**
**HYDRAULIC SYSTEM**
**Samuel B. McClocklin, Owatonna, Minn., assignor to Owatonna Tool Company, Owatonna, Minn.**
**Filed Mar. 17, 1972, Ser. No. 235,573**
**Int. Cl. F04b** *17/00, 35/00*
**U.S. Cl. 417—401** **3 Claims**



A manually operable high pressure release valve in a high fluid pressure system such as an air operated hydraulic pump.

The release valve includes a manually operable pilot poppet valve disposed within a larger, manually operable poppet valve, the two poppet valves having a single manual actuator. Release of high pressure is allowed with a minimum of manual effort by first bleeding off a portion of the fluid under high pressure through opening of the pilot poppet valve until the pressure is reduced to a level whereat the larger poppet valve will easily open.

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3,788,782

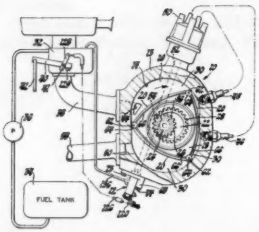
**ROTARY ENGINE OIL METERING PUMP**

**Robert E. Morgan, Grand Rapids, Mich., assignor to General Motors Corporation, Detroit, Mich.**

**Filed Nov. 29, 1972, Ser. No. 310,234**

**Int. Cl. F01c** *21/04*; **F04c** *15/00, 29/02*

**U.S. Cl. 418—84** **3 Claims**



A rotary engine is provided with an oil metering pump having a valve-impeller member that is rotatably mounted in the pump's body and is driven by the engine. An oil supply port in the pump's body is connected to an oil delivery port also in the pump's body via a chamber and then a variable area metering port in the valve-impeller member as this member turns. The area of the metering port is varied by controlling the axial location of the valve-impeller member according to engine throttle opening whereby the pump meters oil to the oil outlet port at a rate which increases with increasing throttle opening and also the centrifugal force of the oil at the metering port and thus with increasing engine speed.

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3,788,783

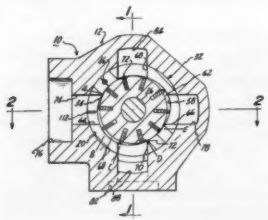
**FLUID PUMPS AND MOTORS**

**Oscar E. Rosaen, 51 Roslyn Rd., Grosse Pointe, Mich.**

**Filed Jan. 6, 1972, Ser. No. 215,761**

**Int. Cl. F01c** *19/00*

**U.S. Cl. 418—108** **13 Claims**



A fluid pump or motor of the rotary sliding vane type comprising a housing having a bore within which is disposed a unitary peripheral cam ring sandwiched between a pair of cheek plates. A sliding vane type rotor is rotatably mounted within the cam ring on a shaft extending axially through the housing bore, the cam ring being shaped to form a pair of diametrically opposed working zones between the cam ring internal surface and the periphery of the rotor. The ends of the working zones are respectively connected to fluid inlet and outlet ports through bores radially extending through the cam ring. The cam ring is axially split preferably at the location of a radially extending bore communicating low pressure fluid to the working zones such that high pressure fluid therein will radially expand the cam ring into a sealing engagement with the housing bore to prevent fluid leakage around the periphery of the cam ring. A method of manufacturing the split cam ring is also disclosed.

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3,788,784

**GLOBOID WORM FLUID-FLOW MACHINES**

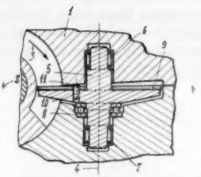
**Bernard Zimmern, 27, Rue Delabardere, Neuilly-sur-Seine, France**

**Filed July 3, 1972, Ser. No. 268,890**

**Claims priority, application France, July 30, 1971, 71.27968**

**Int. Cl. F01c** *5/02*; **F16h** *1/16*

**U.S. Cl. 418—153** **7 Claims**



The invention relates to machines such as compressors or pumps of the kind including an hourglass worm meshing with a toothed pinion. It is known to make the pinion of metal coated with a resilient material such as plastic rigidity fixed to the surface of the metallic pinion. According to the invention the metal pinion is covered with a plastic lining having teeth which engage the threads of the worm and prevent the metal teeth of the pinion from engaging those threads. The plastic lining is permitted a slight shifting about its average position respectively to the metal pinion.

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3,788,785

**METHOD AND APPAkATUS FOR PREHEATING AN UNCURED RUBBER TIRE**

**Joseph Gerard Alphons Smeets, Maastricht, Netherlands, assignor to International B.F. Goodrich Europe B.V., The Hague, Netherlands**

**Filed July 5, 1972, Ser. No. 269,149**

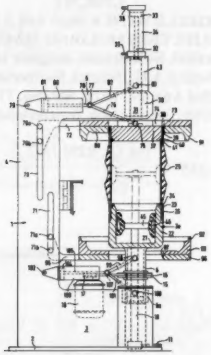
**Claims priority, application Germany, July 10, 1971, 2134525**

**Int. Cl. B29h** *5/02*

**U.S. Cl. 425—32** **10 Claims**

An apparatus for preheating an uncured elastomer-containing pneumatic tire before vulcanization. The preheating means comprises a chamber supported for movement to and from an uncured tire mounted and shaped in a vulcanizing press so that preheating can occur after tire-shaping and before vulcanization. Preferably, the chamber is divided by partition means to provide different zones of preheating for dif-

ferent portions of a tire with an ultra-high frequency energy emitter means in each zone. The apparatus comprises a vulcanizing press with separable tire molding portions, means to support an uncured tire in a hollow, generally cylindrical configuration between the molding portions and shape the tire to



a generally toroidal configuration while the molding portions remain spaced from the tire, the preheating means being movable to and from enclosing relationship with a least a portion of the toroidally shaped tire, and the molding means being movable into engagement with the preheated tire.

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**3,788,786**

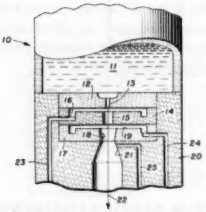
## ORIFICE ASSEMBLY FOR EXTRUDING LOW-VISCOSITY MELTS

**Emerick J. Dobo, Cary, N.C., assignor to Monsanto Company, St. Louis, Mo.**

**Filed Aug. 30, 1972, Ser. No. 284,790**

**Int. Cl. B22d *11/00*; B29f *3/00***

**U.S. Cl. 425—72** **3 Claims**



An improved orifice assembly is provided for extruding filaments from low-viscosity or essentially inviscid melts.

An orifice system typified by an extrusion orifice containing plate and a gas plate containing an orifice for effecting filament attenuation is improved by introducing a third orifice containing plate. The third orifice containing plate functions to reduce or eliminate disturbances from developing in the molten jet stream. The third orifice is characterized by having walls which converge towards the orifice exit.

**3,788,787**

## HYDRAULIC METAL POWDER PRESS

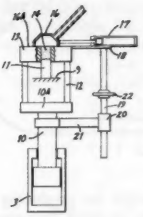
**Hermann Silbereisen; Felix Winterberg, both of Lochnerallee, and Severin Ginzel, Muchen-Moosach, all of Germany**

**Continuation-in-part of Ser. No. 856,434, Sept. 9, 1969, abandoned. This application Nov. 26, 1971, Ser. No. 202,117**

**Claims priority, application Germany, Sept. 9, 1968, 6751221**

**Int. Cl. B22f *3/00***

**U.S. Cl. 425—78** **14 Claims**



A metal powder press having frame means, lower ram means supported on the frame means for vertical movement. A hollow tool matrix is mounted on the lower ram means and movable vertically therewith. Lower press means is receivable in the lower end of the hollow tool matrix. Upper press means are receivable in the upper end of the hollow tool matrix. Metal powder storage means are provided to supply powder to a filling shoe for selectively filling the hollow tool matrix with metal powder.

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**3,788,788**

## INJECTION MOLDING MACHINE

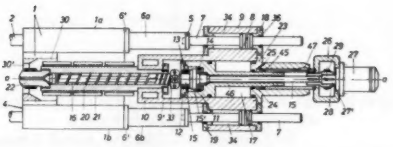
**Karl Hehl, Sielung 183 D-7291, Lossburgh Wurttenberg, Germany**

**Filed Mar. 1, 1972, Ser. No. 230,738**

**Claims priority, application Germany, Mar. 2, 1971, 2109765**

**Int. Cl. B29f *1/02***

**U.S. Cl. 425—192** **12 Claims**



An injection molding machine in which an injection unit is releasably connected to a mold clamping unit for injection transversely of the mold parting line, the injection unit having a plurality of supporting struts centered and releasably fastened to an equal plurality of auxiliary cylinders of the mold clamping unit.

3,788,789

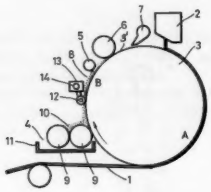
## APPARATUS FOR PRODUCING UNDRAWN POLYAMIDE FILMS HAVING UNIFORM PHYSICAL CHARACTERISTICS

Wakuo Matsumura, Osaka, Japan, assignor to Unitika Kabushiki Kaisha, Hyogo-ken, Japan

Continuation-in-part of Ser. No. 809,255, March 21, 1969, abandoned. This application Oct. 6, 1971, Ser. No. 187,058

Int. Cl. B29d 7/00

U.S. Cl. 425—230 11 Claims



An improved process for producing undrawn polyamide films having uniform physical characteristics by preventing the formation of deposits of impurities on a formation surface. The molten film is extruded on a rotating roller surface where it is cooled and solidified and drawn off after the surface has traveled a distance substantially less than a whole revolution. There is then positioned a first liquid-removal means, polishing means, washing means, second liquid-removal means and drying means in that order in the direction of rotation of the roller when the surface is not in contact with the film. The polishing means may travel both horizontally across the entire width of the roller surface and vertically along a short portion of the roller surface in reciprocal motion to assist in removing the impurity deposits. The polishing means may be either a roller or shaped to conform to the roller surface and may also contain a suitable abrasive. In addition, the washing liquid may act as a polishing medium and may consist either of water or of an alcohol having one to 10 carbon atoms, or a mixture of both. The step of polishing the roller surface and in the presence of a suitable polishing medium allows significantly increase efficiency.

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3,788,790

## MACHINE FOR CASTING UNDER PRESSURE

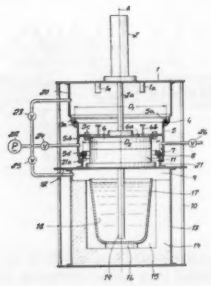
Anguel Tonchev Balevsky; Ivan Dimov Nikolov; Dragan Iliev Nenov, and Emil Nikolov Momchilov, all of Sofia, Bulgaria, assignors to Niitm Pri Ban, Sofia, Bulgaria

Filed Feb. 22, 1972, Ser. No. 227,882

Claims priority, application Bulgaria, Feb. 20, 1971, 16865

Int. Cl. B22d 27/14

U.S. Cl. 425—242 3 Claims



An apparatus for casting under pressure wherein the mold parts are connected to relatively telescoping chamber walls, at least one of which can be actuated by a fluid-responsive device, e.g. a hydraulic cylinder, to ensure tight closure of the mold.

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3,788,791

## CLOSURE NOZZLE WITH A MOVABLE COVER FOR AN INJECTION MOLDING MACHINE

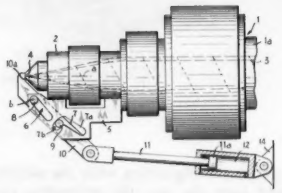
Paul Munz, Netstal, Switzerland, assignor to Maschinenfabrik & Giessrei Netstal A.G., Netstal, Switzerland

Filed Aug. 24, 1971, Ser. No. 174,337

Claims priority, application Switzerland, Aug. 27, 1970, 12872/70

Int. Cl. B29f 1/02

U.S. Cl. 425—245 7 Claims



An injection molding machine includes a closure nozzle having a discharge orifice through which the material which is plasticized is directed. The orifice is closed by a cover member formed at the end of a lever which is pivotal on a slide secured to one side of the injection molding machine housing. The lever has two pivot pins one of which is confined within a slot extending obliquely in respect to the axis of the injection molding machine die orifice and the other of which is confined in an angled slot having one leg portion running in generally the same direction as the first slot and another leg portion running normal thereto. The lever is connected to means for shifting the lever, for example a fluid pressure-operated piston which is articulated to one end of the lever. The pins on the lever which are confined in the respective slots cause the lever to move from the fully opened position first in a direction at an angle to the axis of the orifice and thereafter when the closure seal portion of the lever is located beyond the end of the orifice in a direction causing it to pivot above the pivot pin nearest the orifice to shift the closure portion to a position overlying and sealing the orifice.

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3,788,792

## APPARATUS FOR FABRICATING SYNTHETIC RESIN ARTICLES BY DOUBLE ROTATION OF A MOLD

Tadao Suzuki, Toyohashi, Japan, assignor to Denki Kaguku Kogyo Kabushiki, Kaisha, Tokyo, Japan

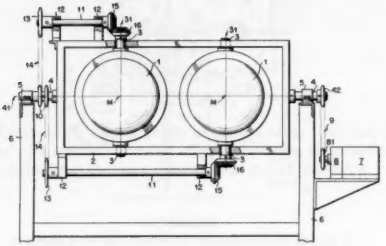
Filed Mar. 30, 1972, Ser. No. 239,651

Int. Cl. B29c 5/04

U.S. Cl. 425—429 6 Claims

An apparatus for fabricating synthetic resin articles by double rotation of molds wherein a plurality of molds are rotatably supported on a frame by rotation shafts for effecting their rotation and the frame is rotatably mounted on a support truck by revolution shafts for effecting the revolution of the frame and consequently the molds. The frame is fitted with

drive shafts and there are provided rotation force transmitting devices between the revolution shafts and drive shafts as well as between said drive shafts and rotation shafts. The axial lines of said rotation and revolution shafts perpendicularly intersect each other substantially at the gravitational center of the articles being fabricated in the molds, and double-chain drive means is provided to impart rotation to the revolution shafts and consequently to the rotation shafts via the rotation force transmitting devices, the drive means being disposed at a position external of the truck and outside of the mold heating and cooling sections of the apparatus.



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**3,788,793**

**APPARATUS FOR MANUFACTURING CONCRETE PIPES, PARTICULARLY SHAFT RINGS**

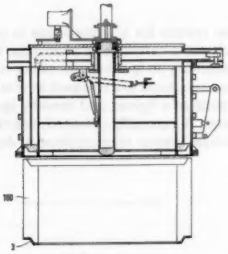
**Rudolf Pappers, Geretsried; Georg Hohberg, Wolfratshausen, and Kurt John, Geretsried, all of Germany, assignors to Knauer GmbH & Co. KG Maschinenfabrik, Geretsried-Gartenberg, Germany**

**Filed Aug. 11, 1971, Ser. No. 170,743**

**Claims priority, application Germany, Aug. 24, 1970, 2041947**

**Int. Cl. B28b** *21/12*

**U.S. Cl. 425—432** **10 Claims**



The method and apparatus for manufacturing concrete pipes, especially for lining shaft rings employs a form mantle and a form core with an annular space therebetween, a plunger, coupling means for temporarily connecting form mantle and core, and independent lifting means for the plunger and for the form mantle, the form mantle and core being coupled together and seated at a forming station, are then uncoupled prior to pouring concrete, then the concrete is poured and compacted and the mantle and core are coupled together again and are withdrawn from the formed work piece.

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**3,788,794**

**CLAMPING UNIT WITH A TURNING PLATE FOR AN INJECTION MOLDING MACHINE**

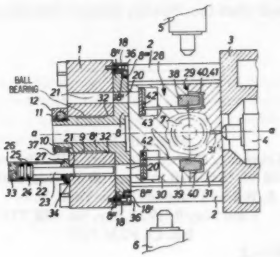
**Karl Hehl, Siedlung 183, Lossburg/Wurtt, Germany**

**Filed Apr. 7, 1971, Ser. No. 132,071**

**Claims priority, application Germany, Apr. 24, 1970, 2019874**

**Int. Cl. B29f** *1/12*

**U.S. Cl. 425—450** **11 Claims**




A clamping unit of an injection molding machine for producing multicolored cast pieces has a pair of mold halves, one of which defines at least two separate mold hollows for the cast piece, and complementary hollows or cores defined in the other mold half for forming at least two cavities in the mold. One of the cavities is configured to the shape of one colored component to the article.* The clamping unit has stationary and movable mold clamping plates. A turning plate is rotatably connected to one of the clamping plates for rotatably mounting one of the mold halves to the respective clamping plates. A fluid piston and cylinder arrangement is used to rotate the rotatably mounted mold half 180° between injections. The ejector is eccentrically mounted with respect to the injection axis and may be mounted in different locations on the clamping plate.

*The other has the configuration of the whole two colored cast piece.

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**3,788,795**

**PRESSURE OPERATED MODULATING METER FOR REGULATING A FLUE DAMPER**

**Edward J. Zeitlin, 115 Fifth Ave., Purdys, N.Y.**

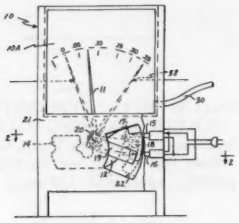
**Continuation-in-part of Ser. No. 70,531, Sept. 8, 1970,. This application June 5, 1972, Ser. No. 259,569**

**Int. Cl. F23d** *5/12*

**U.S. Cl. 431—13** **6 Claims**

A flue draft pressure operated monitoring meter for an electro-optical switching circuit primarily for intermittent regulatory interruption of a current in a circuit to control the direction of rotation of a chimney damper motor to be monitored with a pivotally mounted pointer gauge to intercept the light beam between either of two lamps and photo cell combinations that are connected to said chimney damper reversi-

ble motor through a circuitry for maintaining a desired operation setting and indicating lamps to indicate when there is no draft in said chimney, when there is too much draft in said chimney and when the chimney damper remains open.



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**3,788,796**

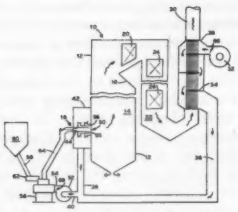
**FUEL BURNER**

**Brett C. Krippene, Barberton; Morris W. Peterson, Medina, and David M. Marshall, Akron, all of Ohio, assignors to The Bolcock & Wilcox Company, New York, N.Y.**

**Filed May 9, 1973, Ser. No. 358,779**

**Int. Cl. F23c** *7/00*

**U.S. Cl. 431—2** **12 Claims**



An improved pulverized fuel burning method and apparatus having means for enhancing the fuel-air mixture passing therethrough and including three separately controlled passageways delivering the air necessary for combustion of the fuel.

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**3,788,797**

**FUEL OIL BURNER LEAD CONTROL MECHANISM**

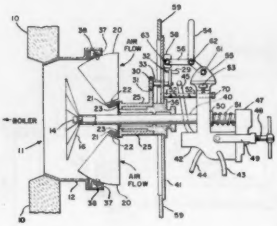
**Robert W. Mayfield, 530 Longbotham Dr., Aston, Pa., and Lawrence T. Mayfield, 218 Sherbrook Blvd., Upper Darby, Pa.**

**Filed Nov. 29, 1972, Ser. No. 310,296**

**Int. Cl. F23c** *5/06*

**U.S. Cl. 431—186** **8 Claims**

Positioning apparatus comprising a bell crank lever for providing a mechanical advantage to move an igniter tip on an oil burner inwardly and outwardly with respect to the location of a boiler. Slotted positioning and supporting guide rods having a wing-nut locking mechanism for locking the igniter tip in place when positioned. Support brackets connect the crank lever to an oil feed system that is rigidly connected to the guide rods and igniter tip for simultaneous movement of the brackets, lever feed system and igniter tip, with the guide rods indicating the position of the igniter tip.



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**3,788,798**

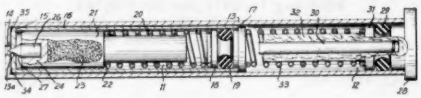
**CHEMICAL IGNITION SYSTEM FOR A CIGARETTE LIGHTER USING AN IGNITION AID**

**Isidor S. Hirschhorn, Orange, and Stanley Tannenbaum, Morristown, both of N.J., assignors to Ronson Corporation, Woodridge, N.J.**

**Filed Apr. 27, 1972, Ser. No. 248,264**

**Int. Cl. F23q** *2/16*

**U.S. Cl. 431—267** **15 Claims**



An ignition system for igniting a gas to produce a flame is shown. It includes a cartridge of aluminum borohydride and a cartridge containing an ignition aid, either methanol or acetaldehyde. These reactants are released in minute quantities into the ignition zone of a lighter and thereby ignite a gaseous fuel such as butane. A coaxially oriented, inertial ignition system and a dual stream system are described in detail.

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**3,788,799**

**BAKERY OVEN**

**George A. Levi, Saginaw, Mich., assignor to Baker Perkins Inc., Saginaw, Mich.**

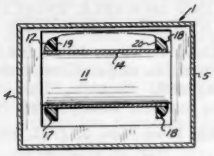
**Filed Jan. 21, 1971, Ser. No. 108,444**

**Int. Cl. A21c** *1/44;* **A21b** *3/00*

**U.S. Cl. 432—143** **1 Claim**

Baking of farinaceous products such as bread and cake by means of an endless band conveyor, at least one run of which

passes through an oven, the conveyor band having secured thereto spaced apart, parallel, upstanding rails which, together with the conveyor band, form at least one dough-receiving




trough extending longitudinally of the conveyor. The rails are formed of a resilient material capable of being stretched and also withstanding the oven heat without loss of resiliency.

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**3,788,800**

## RABBLE FOR ROTARY HEARTH FURNACE

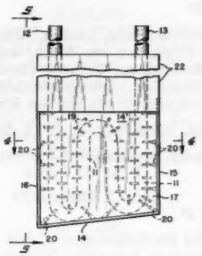
**Horace Middleton, and Frank Tominc, both of Rock Springs, Wyo., assignors to Salem Corporation, Pittsburgh, Pa.**

**Filed Nov. 29, 1972, Ser. No. 310,466**

**Int. Cl. F27d 9/00**

**U.S. Cl. 432—235** **20 Claims**

A fluid cooled rabble construction comprising a plurality of conduits extending along the surface of the rabble. The conduits provide a passageway which is in the nature of a circuitous path and a suitable coolant is circulated therethrough to effect a cooling of the rabble. The rabble may comprise a




box-like element formed of steel or the like to which the conduits are secured or the rabble may comprise a structure composed entirely of a suitable refractory or a combination of a refractory and a steel face and edges.

3,788,801

## PROCESS FOR THE PREPARATION OF FAST DYEINGS AND PRINTS ON FIBROUS MATERIAL CONTAINING HYDROXYL GROUPS OR NITROGEN

Ernst Hille, Ruppertshain, Taunus, Ernst Hoyer and Fritz Meininger, Frankfurt am Main, and Johannes Rottmann, Niedernhausen, Taunus, Germany, assignors to Farbwerke Hoechst Aktiengesellschaft vormals Meister Lucius & Bruning, Frankfurt am Main, Germany

No Drawing. Filed Sept. 1, 1972, Ser. No. 285,670

Claims priority, application Germany, Sept. 1, 1971, P 21 43 750.3

Int. Cl. D06p *1/38*

U.S. Cl. 8—1 P 9 Claims

A process for the preparation of fast dyeings and prints on fibrous materials containing hydroxy groups or nitrogen, which process comprises applying water-soluble organic dyestuffs which contain at least a group of the formula

$$—SO_2—CH_2—CH_2—O—CO—NH—X$$

in the molecule in which group X is a hydrogen atom or an —$SO_3H$— group on the said fibrous materials and fixing them at normal or at elevated temperature or under the action of heat yielding very valuable, intense dyeings and prints which are very stable when being subjected to treatments of washing and to the action of light. They have also a remarkable fastness to water, seawater, rubbing, ironing, acids, alkalis and solvents. When being finished afterwards with synthetic resins in an acid medium, dyeings and prints of the invention show advantageous properties.

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3,788,802

## PAPER DYED WITH WATER SOLUBLE BENZOTHIAZOLYLPHENYLAZOBARBITURIC ACID DYESTUFFS

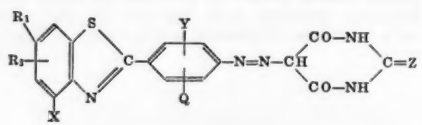
Alvin Carl Litke, West Seneca, N.Y., assignor to Allied Chemical Corporation, New York, N.Y.

No Drawing. Original application Sept. 23, 1970, Ser. No. 74,848, now Patent No. 3,726,851. Divided and this application Feb. 15, 1973, Ser. No. 332,952

Int. Cl. D21h *1/46*

U.S. Cl. 8—7 9 Claims

Monoazo dyestuffs of the formula



wherein $R_1$, X and Y are hydrogen, lower alkoxy or lower alkyl; $R_2$ and Q are H or $SO_3H$ with at least one being $SO_3H$; and Q is oxygen, sulfur, imino, or lower alkyl imino. These dyestuffs color paper and paper pulp in attractive greenish yellow shades but have little affinity for cotton, said paper dyeings being alkali- and acid-fast and discharged on contact with conventional bleaching agents.

3,788,803

## METHOD OF CONCURRENTLY DYEING AND IMPARTING DURABLE BIOACTIVE PROPERTIES TO SYNTHETIC TEXTILES

Stewart E. Klein, Harrison, N.Y., and D. Donald Gagliardi, deceased, late of East Greenwich, R.I., by Frances Dodge Gagliardi, executrix, East Greenwich, R.I., assignors to Sanitized Incorporated, New York, N.Y.

No Drawing. Filed Nov. 2, 1971, Ser. No. 195,035

Int. Cl. D06p *5/18*

U.S. Cl. 8—17 7 Claims

Durable bioactive properties are obtained on synthetic textile fibers and fabrics by applying an aqueous solution or dispersion of a composition containing a dye, a bioactive material and a carrier to the textile by an exhaustion technique.

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3,788,804

## PROCESS FOR DYEING DURABLE PRESS CELLULOSIC FABRICS WITH BASIC DYES

Robert J. Harper, Jr., and Gloria A. Gautreaux, Metairie, and Joseph S. Bruno, Chalmette, La., and Matthew J. Donoghue, Knoxville, Tenn., assignors to the United States of America as represented by the Secretary of Agriculture

No Drawing. Filed Mar. 28, 1972, Ser. No. 238,947

Int. Cl. D06p *5/00*

U.S. Cl. 8—18 9 Claims

Durable-press cellulosic fabrics have been prepared in a process which simultaneously renders them responsive to basic dyes. In a two-phase process the cellulosic component is crosslinked using a crosslinking agent and an alpha-hydroxy carboxylic acid in the first phase (the carboxylic acids serving the dual purpose of catalyst and reactive additive), thus producing a crosslinked cellulosic fabric with pendant carboxylic groups. In the second phase, a basic dye is selectively absorbed by the chemically modified cellulosic textile, due to the presence of the carboxylic groups.

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3,788,805

## PRODUCING MULTICOLOR DYED ACRYLIC TEXTILE CONTAINING WOOL WITH ACID, DIRECT AND CATIONIC DYES

Tomoji Ookubo, Kiyoshi Hashimoto, and Masaru Okada, Okayama, Japan, assignors to Japan Exlan Company Limited, Osaka, Japan

No Drawing. Filed Apr. 23, 1971, Ser. No. 137,005

Claims priority, application Japan, Apr. 27, 1970, 45/36,080

Int. Cl. D06p *3/82*

U.S. Cl. 8—21 A 8 Claims

Process for obtaining multicolored textile products by blending a basic group-containing acrylic fiber and wool, dyeing the product with a direct dye at a pH of 5–9 to dye the acrylic fiber component, treating the entire dyed product with an anionic aromatic polycondensate containing dissociable groups, such as a naphthalenesulfonic acid-formaldehyde condensate, and then dyeing the product in a second bath with an acid dye at a pH of 2–5 to dye the wool component.

3,788,806

## MIXTURES OF 1 - AMINOANTHRAQUINONE-3,4-(N)-BENZACRIDONE DYESTUFFS AND PROCESS FOR DYEING POLYESTER FIBERS THEREWITH

Christian Heid and Ernst Heinrich, Frankfurt am Main-Fechenheim, Germany, assignors to Cassella Farbwerke Mainkur Aktiengesellschaft, Frankfurt am Main-Fechenheim, Germany

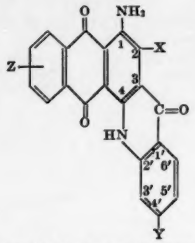
No Drawing. Continuation-in-part of abandoned application Ser. No. 234,989, Mar. 15, 1972. This application May 4, 1973, Ser. No. 357,220

Claims priority, application Germany, Apr. 1, 1971, P 21 15 917.1

Int. Cl. D06p *3/52*; C09b *5/36*

U.S. Cl. 8—25 6 Claims

Composition containing at least two dyestuffs of the formula



wherein X and Z are hydrogen or halogen and Y is hydrogen, halogen or trifluoromethyl, each dyestuff of said composition being present in an amount of at least 5% by weight, based on the weight of the total dyestuffs present.

3,788,807

## DYEING POLYAMIDE BONDED FLEECE BY DWELLING WITH METHOD COMPLEX AZO DYESTUFFS

Hans Beiertz, Kelsterbach, Germany, assignor to Farbwerke Hoechst Aktiengesellschaft vormals Meister Lucius & Bruning, Frankfurt am Main, Germany

No Drawing. Filed July 27, 1971, Ser. No. 166,643

Claims priority, application Germany, July 29, 1970, P 20 37 554.6

Int. Cl. D06p *1/10*

U.S. Cl. 8—26 1 Claim

Process for the dyeing of textile fabrics of polyamide fibers by padding the said fibrous material with certain anionic dyestuffs, preferably selected 1:2-metal-complex dyestuffs, subsequently winding up the padded material on a batch and then allowing it to dwell for fixing the dyestuffs.

3,788,808

## DYESTUFF COMPOSITIONS CONTAINING SULFOMETHYLATED PHENOLIC-FORMALDEHYDE RESIN DISPERSANTS STABILIZED WITH UREA OR AMMONIA

Sten I. Falkehag, Mount Pleasant, and Carl W. Bailey III, Charleston, S.C., assignors to Westvaco Corporation, New York, N.Y.

No Drawing. Filed Mar. 21, 1972, Ser. No. 236,786

Int. Cl. D06p *1/22*, *1/78*

U.S. Cl. 8—34 2 Claims

Dyestuff compositions for use in dying synthetic and natural fibers, comprising an admixture of a dye cake, e.g., disperse dyes or vat dyes, and up to 75% by weight of the total mixture of a dispersant of a modified phenolic-formaldehyde type resin. The dispersants of this invention are phenolic-formaldehyde resins that are sulfomethylated and contain from 1–13 moles of sulfomethylation per 1000 grams of the starting resin. The dispersants may also be cross-linked to tailor their molecular weight and then stabilized with urea or ammonia. These dye dispersants are light in color, excellent dispersants, produce heat stable dye dispersions, lessen or eliminate fiber staining, diazo dye reduction and foaming problems associated with disperse dyes. These dispersants may also be used in combination with other dye dispersants, such as, sulfonated lignins or sulfonated napthalene products, to optimize the advantageous properties of each dispersant.

3,788,809

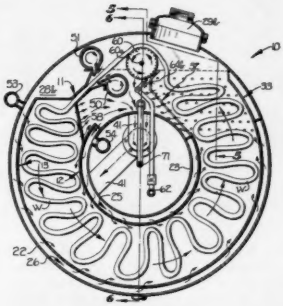
## METHOD FOR LIQUID TREATMENT OF TEXTILE MATERIAL WEBS

William T. Carpenter, Stanley, N.C., assignor to Synalloy Corporation, Spartanburg, S.C.

Original application Apr. 27, 1971, Ser. No. 137,760, now Patent No. 3,685,325, dated Aug. 22, 1972. Divided and this application July 26, 1972, Ser. No. 275,337

Int. Cl. B05c *3/134*

U.S. Cl. 8—152 9 Claims



Textile material webs are subjected to liquid treatment while in open width form by an apparatus and method in which a length of textile web to be treated is arranged in an open width loop and is moved within a generally annular chamber by direction of portions of a circulating liquid flow through a throat zone for entraining the textile web. Treatment liquid is impinged against both surfaces of the textile web by direction of portions of the circulating liquid flow through spaced arcuate inner and outer walls which define a treatment zone adjacent to and of a greater cross-sectional area than the throat zone. Agitated contact of treatment liquid with the textile web material occurs throughout both the throat and treatment zones and thorough treatment of the textile web is thereby facilitated. Further, distribution of the portions of the circulating liquid flow assures uniformity of conditions throughout the throat and treatment zones.

3,788,810

## PROCESS FOR THE DYEING OF SYNTHETIC FIBRE MATERIALS WITH QUINOPHTHALONE DYESTUFFS FROM ORGANIC SOLVENTS

Dietmar Kalz, Cologne, Gerhard Wolfrum, Opladen, and Rütger Neeff, Leverkusen, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

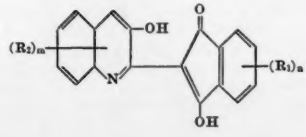
No Drawing. Filed July 16, 1971, Ser. No. 163,414

Claims priority, application Germany, July 18, 1970, P 20 35 728.2

Int. Cl. D06p *3/26*, *3/42*, *3/48*, *3/54*, *3/72*

U.S. Cl. 8—162 R 8 Claims

Exhaust process for the dyeing of synthetic fibre materials from organic water-immiscible solvents wherein are used as dyestuffs quinophthalone dyestuffs of the formula



in which $R_1$ denotes a halogen atom, an alkyl, alkoxy, nitro, amino, acylamino, alkylamino, carboxylic acid ester or aryl radical and $R_2$ denotes a halogen atom, an alkyl, alkoxy, nitro or acylamino group, or in which two adjacent substituents $R_2$ stand for the residual members of a fused aromatic ring; and $n$ and $m$ represent integers from 0 to 4.

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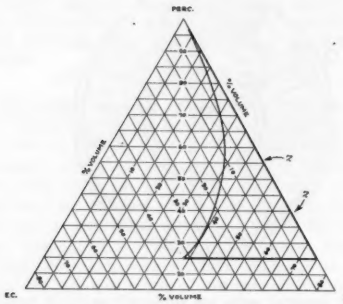
**3,788,811**
**SOLVENT COMPOSITIONS FOR SOLVENT DYEING AND DYESTUFF SOLUTIONS PREPARED THEREFROM**

**Frederic Leroy Sievenpiper, Alden, and Elmore Bement, Buffalo, N.Y., assignors to Allied Chemical Corporation, New York, N.Y.**

**Filed May 18, 1971, Ser. No. 144,603**
**Int. Cl. D06p *1/68***
**U.S. Cl. 8—175** **36 Claims**




Certain mixtures of halogenated hydrocarbons, polar liquids which are swelling agents for a textile fiber and which are substantially insoluble in the halogenated hydrocarbons, and organic liquids which are soluble in both the halogenated hydrocarbons and the polar solvent, form clear, stable, homogeneous compositions which are useful as solvents for diverse types of dyestuffs. Solutions of dyestuffs in these solvent compositions may be used to produce excellent dyeings on man-made and natural fibers.

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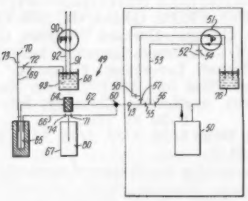
**3,788,812**
**AUTOMATIC SATURATION ANALYSIS**

**John Dupré, 92 Stafford, Baie d'Urfe, Quebec, Canada**

**Filed Aug. 30, 1971, Ser. No. 176,211**
**Int. Cl. G21h *5/02*; G01n *33/16***
**U.S. Cl. 23—230 B** **15 Claims**



An apparatus and a process for automatic saturation analysis of a solution comprising predetermined volumes of reagents and sample specimen. The apparatus comprises a first automatic transfer means for delivering a predetermined volume of reagents and a sample specimen into a reaction container for incubation where the tracer reagent equilibrates with a binding agent in solution distributing between bound and free moieties. A second automatic tranfer means delivers a predetermined volume of absorbent particles suspended in a buffer solution to the reaction container to absorb the free moiety of the tracer. A third automatic transfer means is provided having a filter associated therewith for separating the absorbent particles from the solution in the reaction container and for delivering the filtrate to a counting chamber for a quantitative measure of the radioactivity of the filtrate solution. Means are further provided for washing the first and third automatic transfer means to prevent contamination of successive solutions to be analyzed.

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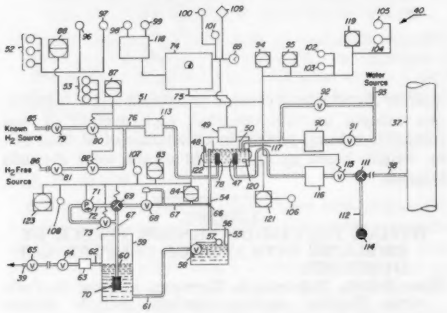
**3,788,813**
**GAS CONDITIONING AND ANALYZING SYSTEM**

**Francis R. Busch, Morgan Hill, Calif., assignor to General Electric Company**

**Filed Sept. 7, 1971, Ser. No. 178,113**
**Int. Cl. G01n *31/12*; G21c *17/00***
**U.S. Cl. 23—232 E** **27 Claims**




A gas conditioning and analyzing system for conditioning and analyzing a sample of gas of any given temperature, pressure and moisture content. The system draws off a sample of gas from a source in a conduit leading to a detection chamber having conditioning means and a sensing means which is connected to a gas analyzer. A gas and liquid outlet from the detection chamber has means for separating the gas from the liquid with the gas being passed in a flame isolation line and introduced into a flame checking chamber under liquid after which the gas is passed out of the system. The system is able to analyze potentially explosive mixtures of gases in a safe manner. The analysis is continuous and rapid.

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**3,788,814**
**HIGHLY ENRICHED MULTIPLY-LABELED STABLE ISOTOPIC COMPOUNDS AS ATMOSPHERIC TRACERS**

**Maxwell Goldblatt and Berthus B. McInteer, Los Alamos, N. Mex., assignors to the United States of America as represented by the United States Atomic Energy Commission**

**No Drawing. Filed Feb. 1, 1972, Ser. No. 222,703**
**Int. Cl. G01n *33/00*; G21h *5/02***
**U.S. Cl. 23—232 R** **4 Claims**

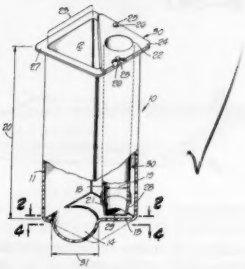
Compounds multiply-labeled with stable isotopes and highly enriched in these isotopes are readily capable of detection in tracer experiments involving high dilutions. Thus, for example. $^{13}C^{18}O_2$ provides a useful tracer for following atmospheric pollution produced as a result of fossil fuel burning.

3,788,815

## CHEMICAL SAMPLE REACTOR MODULE

Donald G. Rohrbaugh, Santa Ana, Calif., assignor to Beckman Instruments, Inc.

Filed Mar. 2, 1972, Ser. No. 231,348
Int. Cl. G01n 1/10, 1/14
U.S. Cl. 23—253 R 10 Claims



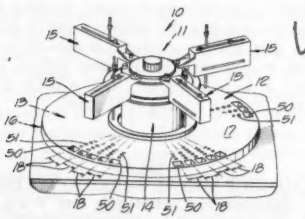
An elongated sample solution cup has a cross section adapted to inducing turbulence in a solvent stirred in the cup, and has an offset recessed bottom cavity providing a localized dissolver volume for solid samples introduced into the cup. A removable filter tube provides a filtered sample solution for further wet analysis. The reactor module comprising the solution cup and the removable filter tube is made of a thin wall thermoplastic material, suitable for using one or more times.

3,788,816

## CHEMICAL ANALYSIS ROTARY MODULE

Donald G. Rohrbaugh, Santa Ana, and William R. Pearson, Placentia, Calif., assignors to Beckman Instruments, Inc.

Filed Mar. 2, 1972, Ser. No. 231,353
Int. Cl. G01n 1/10, 1/18
U.S. Cl. 23—253 R 15 Claims



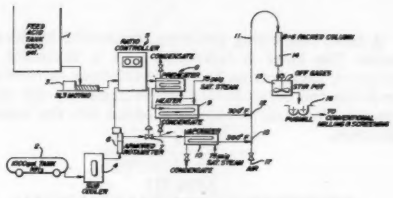
A chemical sample reactor module, containing a solution of a chemical sample prepared for analysis, is cooperatively paired with a chemical analysis tube module in precise radial alignment in a rotary index table. Multiple paired modules are radially coaligned in the table during the consecutive analysis of a series of chemical samples. Plural sample probes, having individually adjusted vertical and horizontal displacement traverses, are each individually positioned as required on a reciprocating, vertically displaceable central pedestal, providing repetitive programmed transfer and addition of metered reagent volumes to aliquot solution samples. The rotary index table sequentially provides a precise timed period for each aliquot sample solution to uniformly react with precise reagent volumes in a chemical analysis procedure. Utilizing an automated sample probe, a final aliquot analysis procedure sample is measured for a component concentration in a cooperative analytical instrument.

3,788,817

## MAKING AMMONIUM POLYPHOSPHATE IN A PACKED COLUMN

John L. Kolbe, Clarksville, and Casimer C. Legal, Jr., Elkridge, Md., assignors to W. R. Grace & Co., New York, N.Y.

Original application Jan. 26, 1970, Ser. No. 5,571, now Patent No. 3,650,727. Divided and this application June 1, 1971, Ser. No. 148,943
Int. Cl. C05b 1/06
U.S. Cl. 23—259.2 4 Claims



Hydrolysis of ammonium polyphosphate can be significantly delayed and reduced when the hot freshly made ammonium polyphosphate reaction mixture, still under pressure, is passed through a column containing an inert packing e.g. tabular alumina, silicon carbide, or porcelain.

3,788,818

## METHOD FOR GROWING CRYSTALS USING A SEMIPERMEABLE MEMBRANE

Abdul Hamid Madjid and Allen R. Vaala, State College, Walter F. Anderson, Jr., University Park, and Joseph Pedulla, Jr., State College, Pa., assignors to Research Corporation, New York, N.Y.

No Drawing. Filed Apr. 22, 1971, Ser. No. 136,569
Int. Cl. B01j 17/04
U.S. Cl. 23—300 6 Claims

A process for growing crystals wherein a first solvent is loaded with a crystallizable solute or crystal precursor and separated from a second solvent in which the crystals are less soluble, by a diffusion boundary, such that crystals are grown from nucleation sites at the diffusion boundary as the second solvent diffuses into the first solvent. This process is highly suitable for growing a wide variety of crystals, including many which have been heretofore difficultly obtainable by other crystallization methods.

3,788,819

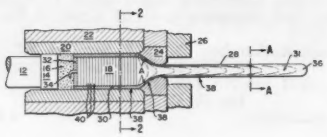
## METHOD OF CRYSTALLIZING USING MAGNETIC MATERIALS

Earl Clarence Oden, P.O. Drawer "CN," State College, Miss. 39762

No Drawing. Filed June 21, 1971, Ser. No. 155,316
Int. Cl. B01d 9/04
U.S. Cl. 23—300 8 Claims

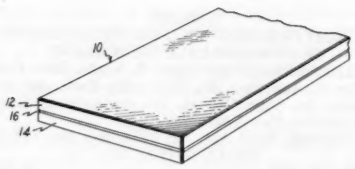
The invention relates to a method of separating at least one component from a solution mixture of chemical compounds having a narrow range of boiling points. The separation comprises cooling the mixture to about the saturation point and adding thereto a magnetic material which has been cooled to below the super saturation temperature of the solution. Crystals of the component formed on the magnetic material are separated from the solution by magnetic separation means.

3,788,820
**FILLED EXTRUSION BILLETS AND METHODS OF FABRICATING**
James G. Hunt, Framingham, Mass., assignor to Polymet Corporation, Cincinnati, Ohio
Filed Jan. 2, 1970, Ser. No. 231
Int. Cl. B32b *15/00*
U.S. Cl. 29—187 36 Claims



A billet comprising preforms surrounded by filler material. The billet is fabricated with a laminated filler structure, each lamina having perforations to receive the preforms and being divided into segments by thin parting regions. The preforms are end loaded into the laminated structure.

3,788,821
**COMPOSITE THERMOSTAT MATERIAL**
Jacob L. Ornstein, Norton, Mass., assignor to Texas Instruments Incorporated, Dallas, Tex.
Filed Dec. 21, 1970, Ser. No. 100,159
Int. Cl. B23p *3/00*
U.S. Cl. 29—195.5 1 Claim



A relatively low cost multilayer composite thermostat material is disclosed having predetermined characteristics of electrical resistivity and flexivity, and including first and second layers of preselected metallic alloys having relatively high and relatively lower coefficients of thermal expansion respectively, and an intermediate layer of a substantially nickel-free metallic alloy having a preselected thickness relative to the total thickness of the composite material such that the composite material has a resistivity of between approximately 625 to 725 ohms per circular mil foot and a flexivity of between approximately $200\times10^{-7}$ to $220\times10^{-7}$ inch per inch per degree Fahrenheit. In the disclosed composite, the first preselected metallic alloy comprises a material comprising by weight approximately 71% to 76% manganese, 9% to 19% copper, and 9% to 17% nickel, while the second preselected metallic alloy comprises a metallic alloy such as the material commonly referred to as Invar, which comprises by weight approximately 35½% to 36½% nickel and the balance iron. The first and second layers are metallurgically bonded to respective opposite surfaces of the intermediate layer of the preselected ferrous alloy to define a composite thermostat material having comparable characteristics to presently available thermostat material, only available at substantially higher costs.

3,788,822
**NON-MAGNETIC COMPOSITE HAVING A CONSTANT MODULUS OF ELASTICITY**
Hiroshi Hashimoto, Chiba, and Toshio Matsumura, Asaka, Japan, assignors to Kabushiki Kaisha Hattori Tokeiten, Tokyo, Japan
Filed Mar. 17, 1971, Ser. No. 125,231
Claims priority, application Japan, Mar. 18, 1970, 45/22,253
Int. Cl. B32b *15/00*
U.S. Cl. 29—196.1 3 Claims

A non-magnetic material composite having a thermally constant modulus of elasticity in or after subjection to a magnetic field comprising at least two base alloy layers having frequency temperature characteristics opposite to each other and selected from base alloys containing as principal constituents iron and manganese, or further containing one or more other elements such as nickel, cobalt and chromium. The base alloy layers are superposed and joined together so that the opposite characteristics are cancelled by each other. Non-magnetic material composites having a low temperature coefficient of natural frequency over a wide temperature range and excellent mechanical properties are thereby produced.

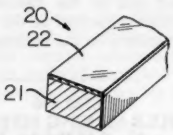
3,788,823
**BRAZED FOAMED METAL**
Ronald L. Wells, Laramie, Wyo., assignor to Ethyl Corporation, New York, N.Y.
No Drawing. Filed Apr. 21, 1971, Ser. No. 136,235
Int. Cl. B32b *15/00*
U.S. Cl. 29—197 1 Claim

Composite articles are prepared utilizing brazing to apply a metal body to a foamed metal substrate. Preferably, the substrate is a foamed aluminum, and the applied metal body is an aluminum sheet. Brazing substances which are liquid below the melting point of the sheet are employed. The brazing substance is applied in a manner to wet the treated surface. One way wetting can be accomplished is by rubbing the surface while it has been treated with molten brazing substance.

3,788,824
**ALUMINOUS METAL BRAZING MATERIALS**
Ogle R. Singleton, Jr., and Bennie Ray Ward, Jr., Richmond, Va., assignors to Reynolds Metals Company, Richmond, Va.
Continuation-in-part of abandoned application Ser. No. 18,255, Mar. 10, 1970. This application Oct. 5, 1971, Ser. No. 186,632
Int. Cl. B32b *15/00*
U.S. Cl. 29—197.5 14 Claims

An improved aluminum alloy, referred to as a core material, is provided which is particularly adapted for use in manufacturing articles by vacuum brazing techniques because such core material has optimum resistance to sag at brazing temperatures and because it has a solidus of about 1160° F. to 1180° F., is heat treatable to a minimum yield strength of 12,000 p.s.i., and is corrosion resistant. A heat treatable cladding alloy is also provided for use as a brazing component either alone or with such core material and other suitable core materials. The

preferred cladding alloy has a liquidus of about 1065–1085° F., has a narrow melting range of about 20° to




about 40° F., is corrosion resistant, and provides joints of optimum strength and quality.

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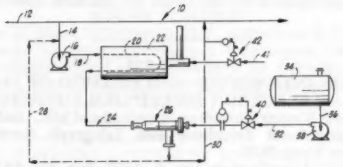
**3,788,825**

## METHOD OF VAPORIZING AND COMBINING A LIQUEFIED CRYOGENIC FLUID STREAM WITH A GAS STREAM

**Edwin M. Arenson, Oklahoma City, Okla., assignor to Black, Sivalls & Bryson, Inc., Kansas City, Mo.**

**Continuation-in-part of application Ser. No. 6,889, Jan. 29, 1970. This application Oct. 6, 1970, Ser. No. 78,504**
**The portion of the term of the patent subsequent to Nov. 13, 1990, has been disclaimed**
**Int. Cl. F17d *1/04***
**U.S. Cl. 48—190** **6 Claims**



The present invention relates to an improved method of vaporizing and combining a stream of liquefied cryogenic fluid, such as liquefied natural gas, with a gas stream, such as natural gas. The gas stream is divided into first and second portions, and the pressure of the first portion is elevated an amount sufficient to cause it to pass through a heating circuit and recombine with the second portion of the gas stream. The first portion of the gas stream is heated within the heating circuit, and the stream of liquefied cryogenic fluid to be vaporized and combined with the gas stream is injected directly into the heated first portion within the heating circuit so that the liquefied cryogenic fluid is vaporized and mixed with the first portion of the gas stream. The resulting mixture of vaporized cryogenic fluid and the first portion of the gas stream is then combined with the second portion of the gas stream.

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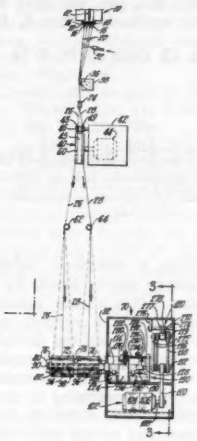
**3,788,826**

## APPARATUS FOR WINDING TEXTILE MATERIAL

**Jerome P. Klink, Granville, and Phra D. Lyle and Terry L. Griffith, Newark, Ohio, assignors to Owens-Corning Fiberglas Corporation**

**Filed Dec. 8, 1971, Ser. No. 206,007**
**Int. Cl. B65h *54/02*; C03b *37/02***
**U.S. Cl. 65—11 W** **12 Claims**

Apparatus for packaging linear material including a driven rotatable collector upon which linear material is wound as a package, means for reducing the angular speed of the collector to keep a substantially constant collection speed, a movable traverse for distributing the linear material on the package, means for sensing the angular speed



of the collector as an indication of package size and means responsive to the sensed speed for moving the traverse to keep the traverse in predetermined spaced relation to the package during collection.

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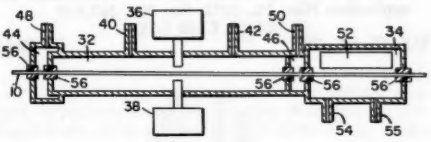
**3,788,827**

## IONIC TREATMENT FOR GLASS OPTICAL WAVEGUIDE FIBERS

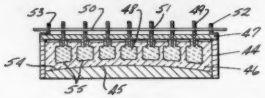
**Robert D. De Luca, Big Flats, N.Y., assignor to Corning Glass Works, Corning, N.Y.**

**Filed Jan. 4, 1972, Ser. No. 215,319**
**Int. Cl. C03c *15/00*; C03b**
**U.S. Cl. 65—30** **12 Claims**



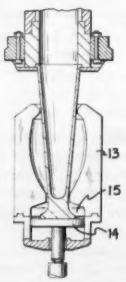

A method for removing contaminants from the surface of a glass optical waveguide fiber and thereafter treating the fiber while preventing the surface from being recontaminated. Contaminants are removed from the surface by such methods as bombardment thereof by dense, focused high energy ion beams or passing the fiber surface through corona or radio frequency induced plasmas. The cleaned fiber may be immediately heat treated to improve the light transmission properties thereof, or it may be coated to prevent recontamination of the surface prior to heat treatment to which the coated fiber may thereafter be subjected.

3,788,828
**MOLDING OF LIGHTWEIGHT GLASS ARTICLES AND APPARATUS THEREFOR**
Lewis M. Austin, Robert R. Denman, Thomas P. O'Donnell, and Frank Veres, Toledo, Ohio, assignors to Owens-Illinois, Inc.
Application July 1, 1965, Ser. No. 468,691, now Patent No. 3,484,328, which is a continuation-in-part of abandoned application Ser. No. 437,431, Mar. 5, 1965. Divided and this application Aug. 5, 1969, Ser. No. 862,122
Int. Cl. C03b *29/00, 9/14*
U.S. Cl. 65—33 11 Claims



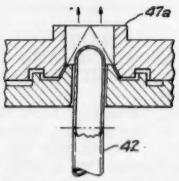

Method of making a one-piece, lightweight article, illustratively a telescope mirror blank, by maintaining a molten vitreous mass within a zone, maintaining at least one shaped module having a support member affixed thereto within the zone wherein the module and at least a portion of the support member are completely immersed in the molten zone. The modules are made of a heat resistant material capable of retaining its shape during immersion in the molten glass. After the viscosity of the vitreous mass is increased to the point where the mass is self-supporting, the glass mass containing at least one module may be removed from the zone. Subsequently, the modules can be removed by chipping out with a suitable tool, for example, and the support member can be removed from the article. The resulting article has formed therein at least one cavity which is disposed between its upper and lower surfaces and also has at least one opening within one of its surfaces communicating with the cavity in its interior. The cross-sectional area of the opening is smaller than that of the cavity. Subsequently, if desired, the glass can be thermally in situ crystallized to produce a low expansion glass ceramic material.

3,788,829
**METHOD FOR MAKING GLASSWARE**
Robert J. Miner and Harry W. Meek, Toledo, Ohio, assignors to Owens-Illinois, Inc.
Continuation of appplication Ser. No. 137,081, Apr. 23, 1971, which is a continuation of application Ser. No. 778,645, Nov. 25, 1968, both now abandoned. This application Nov. 20, 1972, Ser. No. 307,810
Int. Cl. C03b *9/00*
U.S. Cl. 65—79 8 Claims



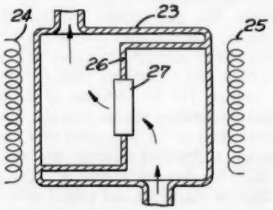

A method and apparatus for making glassware wherein a charge of glass is delivered to a parison mold, pressed in the parison mold, transferred to a blow mold, and a body portion is blown in the blow mold while a heavier base portion is pressed in the blow mold. In this process, an elongated charge is transferred to the blow mold after which the heavy end of the charge sags downwardly through the restricted portion of the mold but does not appreciably accumulate on the bottom plate before blowing.

3,788,830
**BULB MAKING METHOD**
Bernard Shaw, Mayfield Heights, Ohio, assignor to General Electric Company
Filed Nov. 9, 1971, Ser. No. 196,927
Int. Cl. C03b *23/04, 29/00*
U.S. Cl. 65—110 2 Claims




An apparatus and method for forming bulbs from heated glass tubing in which the tubing is placed inside a forming head cavity where a molten end wall of the tubing is shaped to bulb form through the action of a vacuum created by the effect of gas flow over the end wall.

3,788,831
**IMAGE INTENSIFIER AND METHOD OF MAKING AN ELECTRON MULTIPLIER THEREFOR**
Richard Kaspar Orthuber, Sepulveda, Calif., assignor to International Telephone and Telegraph Corporation, New York, N.Y.
Original application Apr. 8, 1969, Ser. No. 815,519. Divided and this application Feb. 22, 1971, Ser. No. 117,697
Int. Cl. B01j *17/00;* C03b *21/00*
U.S. Cl. 65—111 5 Claims




The invention includes a channel-type electron multiplier incorporating a glass plate having holes therethrough. The plate is treated so that the holes will support secondary emission. When primary electrons from a photocathode enter the holes, an increased current density is produced at the output of the holes. When the output is directed onto a phosphor screen, an intensified image of the scene being viewed is produced. Night scenes may thus be brightened for use in military reconnaissance or the like. However, channel-type electron multipliers have what is known as a saturation level of operation beyond which an increase in input current produces little or no increase in output current. The device of the present invention alleviates this problem by increasing electrical resistance near

the output. This construction makes it possible to produce a special electric field distribution in the holes. This field distribution then causes the gain of the multiplier to saturate at substantially higher input current levels. In addition, a multiplier of this type will exhibit a nonlinear input versus output relationship such that, if incorporated in an image tube (direct view or TV pickup), it imparts to this tube highly desirable contrast enhancing characteristics.

The invention also includes a method of making the special type of electron multiplier having the hole surface resistivity variation.

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3,788,832

**PROCESS FOR PRE-TREATING AND MELTING GLASSMAKING MATERIALS**

**John D. Nesbitt and Mark E. Fejer, Chicago, Ill., assignors to Institute of Gas Technology, Chicago, Ill.**

**Filed Aug. 25, 1972, Ser. No. 283,926**

**Int. Cl. C03b *5/16***

**U.S. Cl. 65—134** **14 Claims**

An improved process for pre-treating and melting glassmaking materials wherein, in a preferred embodiment, the glass batch is compacted or agglomerated into distinct units, preheated and then conveyed into a glass furnace or melter. The glass batch preferably is compacted into briquets using an improved process, and the glass batch is preheated with the combustion gases from the glass furnace in a fashion such that particulate matter, particularly sodium sulfate, is removed from the combustion gases. Melting preferably is accomplished using a submerged combustion process.

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3,788,833

**PRODUCTION OF PALLADIUM-SILVER ALLOY POWDER**

**Oliver A. Short, Wilmington, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.**

**No Drawing. Original application Mar. 29, 1971, Ser. No. 129,175, now abandoned. Divided and this application Feb. 18, 1972, Ser. No. 227,685**

**Int. Cl. B22f *9/00*; C22b *5/00***

**U.S. Cl. 75—.5 A** **2 Claims**

There is provided a method for producing solid solution palladium-silver alloys in finely-divided form by reducing particles of palladium silver carbonate in suspension in an aqueous medium.

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3,788,834

**METHOD OF BENEFICIATING ORES**

**Clarence L. Hildreth, Brookhaven, Miss., assignor to Ethyl Corporation, Richmond, Va.**

**No Drawing. Continuation-in-part of abandoned application Ser. No. 41,588, May 28, 1970. This application Feb. 26, 1973, Ser. No. 335,701**

**Int. Cl. C22b *1/08***

**U.S. Cl. 75—1** **4 Claims**

A method of beneficiating or upgrading alumina-silica or aluminum-silicate ores, especially natural clays containing substantial amounts of minerals such as kyanite, diaspore and the like and also containing contaminating amounts of iron and titanium, wherein the ore is heated to a relatively high temperature and treated with hexachlorobutadiene, hexachlorobenzene or mixtures largely comprising these compounds.

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3,788,835

**IRON ORE REDUCTION PROCESS (NU-9)**

**William E. Lewis and John D. Paynter, Baton Rouge, La., assignors to Esso Research and Engineering Company**

**No Drawing. Filed Dec. 30, 1970, Ser. No. 102,937**

**Int. Cl. C21b *1/02***

**U.S. Cl. 75—26** **10 Claims**

A staged fluidized iron ore reduction process is provided in which carbon is deposited on the iron ore in the reduction zone where the major portion of the metallization is effected with the gaseous reductant. After further gaseous reduction to a highly metallized material the reduced ore is held under conditions sufficient to allow the deposited carbon to interact with residual oxides thereby further increasing the metallization of the iron ore.

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3,788,836

**METHOD OF MAKING LOW NITROGEN ALLOYS**

**Francis L. Muscatell, Loudonville, N.Y., and Sundaresan Ramachandran, Natrona Heights, and Orville W. Reen, Lower Burrell, Pa., assignors to Allegheny Ludlum Industries, Inc., Pittsburgh, Pa.**

**No Drawing. Continuation-in-part of abandoned application Ser. No. 720,481, Apr. 11, 1968. This application Mar. 26, 1971, Ser. No. 128,531**

**Int. Cl. C21c *7/10***

**U.S. Cl. 75—49** **10 Claims**

An improvement in the manufacture of steel of low nitrogen content, which comprises the steps of: compacting steel having an average thickness of less than 0.25 inch into a porous mass; heating the porous mass at a temperature between about 2000° F. and the melting point of the steel, in a vacuum at a pressure below one mm. Hg, for a period of time sufficient to remove at least 70% of the nitrogen therefrom; melting the porous mass in a furnace having a controlled atmosphere; and casting the melt.

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3,788,837

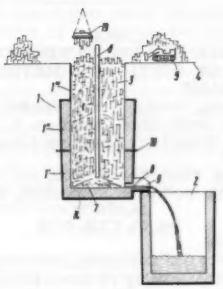
**METHOD FOR MELTING PARTICULATE METAL**

**Gunter Geck and Hans Jurgen Langhammer, Hagen, Germany, assignors to Klockner-Werke AG, Duisburg, Germany**

**Continuation-in-part of abandoned application Ser. No. 862,762, Oct. 1, 1969. This application Mar. 22, 1972, Ser. No. 237,158**

**Int. Cl. C21c *7/04***

**U.S. Cl. 75—55** **6 Claims**



A charge of scrap iron is melted in an upright elongated, in part refractory lined melting chamber by a disc-shaped flame acting on the lower end of the charge whereby the melted metal flows onto the bottom wall of the chamber and becomes interposed between the bottom wall and the flame so that the bottom wall is protected by the interposed metal from the flame. The flame is produced from a mixture of fuel and oxygen blown into the melting chamber through a lance. The melted scrap iron is discharged into a container containing an amount of liquid pig iron and the percentage of oxygen in the fuel-oxygen mixture is adjusted in such a manner that the melted metal discharged from the melting chamber contains a percentage of FeO which will produce in the container together with added lime a reactive slag so that refining of the metal bath in the container into steel will take place without blowing oxygen directly into the metal bath in the container.

3,788,838

## METHOD OF REMOVING VAPORIZED LEAD FROM GASES AFTER CONTACT WITH LIQUID LEAD

Werner Wenzel and Leon-Michel Chaussy, Aachen, Germany, assignors to Rheinische Braunkohlenwerke AG, Cologne, and Werner Wenzel, Aachen, Germany

No Drawing. Filed June 10, 1970, Ser. No. 45,206
Claims priority, application Germany, June 20, 1969, P 19 31 481.9
Int. Cl. C22b *13/00*
U.S. Cl. 75—77 10 Claims

In order to remove vaporized lead from a gas following its contact with liquid lead, said gas, prior to subsequent use, is contacted with a liquid metal or alloy which precipitates said vaporized lead.

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3,788,839

## METHOD FOR INCORPORATING METALS INTO MOLTEN METAL BATHS

John Porter Faunce, Columbia, Md., assignor to Diamond Shamrock Corporation, Cleveland, Ohio

No Drawing. Continuation-in-part of application Ser. No. 203,026, Nov. 29, 1971. This application Feb. 28, 1972, Ser. No. 230,073
Int. Cl. C22b *9/08*; C22c *21/00*
U.S. Cl. 75—93 R 6 Claims

Finely divided metals and alloys containing a specified quantity of minus 80 mesh particles are added to molten metal baths such as baths of aluminum and aluminum alloys. The finely divided metals and alloys are provided by crushing and screening the metals and enclosing the resultant product by any conveniently handled container such as a closed bag. This technique is useful for adding finely divided metals and alloys to molten metal baths by providing rapid metal solubility, high metal recovery, low cost and elimination of the need for special equipment and complicated process operations.

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3,788,840

## FLUX POWDER FOR USE DURING CONTINUOUS CASTING OF STEEL AND METHOD OF PRODUCING SAME

Peter J. Koenig, Zumikon, and Friedrich Hofmanner, Regensdorf, Switzerland, assignors to Concast AG, Zurich, and Holderbank Financiere Glarus AG, Glarus, Switzerland

No Drawing. Filed Nov. 6, 1972, Ser. No. 304,117
Claims priority, application Switzerland, Nov. 12, 1971, 16,474/71
Int. Cl. C22b *9/10*
U.S. Cl. 75—94 9 Claims

A flux powder and method of producing same for use during continuous casting of steel, containing portland cement, a fluxing agent, and a carbon carrier, wherein the carbon carrier possess a grain size less than 1$\mu$, the aluminum oxide content of the powder is in the range of 2–12% by weight, and the lime-silica ratio is adjusted to be in the range of 0.7–1.0 through the addition of quartz powder.

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3,788,841

## RECOVERY OF METAL VALUES FROM MANGANESE NODULES

Jagdish C. Agarwal, Concord, and Thomas C. Wilder, Cambridge, Mass., assignors to Kennecott Copper Corporation, New York, N.Y.

Filed Sept. 28, 1971, Ser. No. 184,397
Int. Cl. C22b *1/08, 3/00*
U.S. Cl. 75—103 15 Claims

This invention concerns a method for recovery of copper, nickel, cobalt and molybdenum from deep sea manganese nodules in which the nodules are ground, balled, roasted and leached.

3,788,842

## PROCESS FOR RECOVERING MERCURY

Gerhard Nolte and Hans Rabowsky, Hurth-Knapsack, Johannes Krause, Hurth-Hermulheim, and Hans-Dieter Narres, Cologne-Bickendorf, Germany, assignors to Knapsack Aktiengesellschaft, Knapsack, near Cologne, Germany

No Drawing. Filed Jan. 21, 1972, Ser. No. 219,842
Claims priority, application Germany, Jan. 22, 1971, P 21 02 900.5
Int. Cl. C22b *3/00*
U.S. Cl. 75—109 12 Claims

Mercury is recovered in metallic form from an aqueous solution, particularly from a salt brine, having mercury compounds therein. To this end, the solution or brine is treated with an iron-containing alloy, the potential of which, determined in the solution or brine, is by at least 100 millivolts more positive than that of iron.

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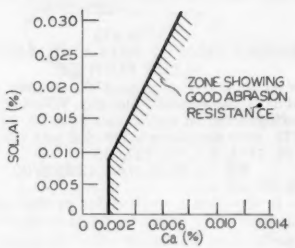
3,788,843

## STEEL HAVING IMPROVED FREE-CUTTING PROPERTIES

Tohru Mimino, Tokyo, Shuuroku Nara and Yoshio Miyashita, Kawasaki, and Katsuhiko Nishikawa, Yokohama, Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Filed June 30, 1971, Ser. No. 158,217
Claims priority, application Japan, June 30, 1970, 45/56,494
Int. Cl. C22c *37/10, 39/02*
U.S. Cl. 75—124 4 Claims




A machine structure steel having superior free-cutting properties, yield strength and tensile strength and comprising the addition of 0.002% to 0.02% Ca, 0.005% to 0.04% Sol. Al. and 0.005% to 0.1% Nb and/or V, to known composition contained in ordinary steel.

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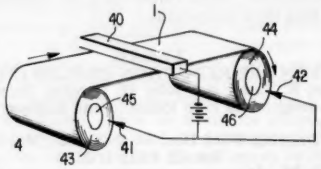
3,788,844

## CHARGING METHOD FOR ELECTROPHOTOGRAPHY

Masamichi Sato and Isozi Takahashi, Asaka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Oct. 5, 1971, Ser. No. 186,668
Int. Cl. G03g *13/02, 13/22*
U.S. Cl. 96—1 C 15 Claims




An electrophotographic method for charging the surface of an elongated electrophotographic member wound

upon at one roll, the member including a photoconductive insulating layer disposed on an ungrounded conductive substrate interposed between the photoconductive insulating layer and an electrically insulating substrate by simultaneously respectively applying high charging voltages of opposite polarities to a main corona discharge electrode disposed adjacent to the upper surface of the elongated member and a sub-discharge corona discharge electrode disposed adjacent the side of the roll.

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**3,788,845**

**PROCESS FOR FORMING DYE IMAGES**

**Sadao Osawa, Yasuo Tamai, and Masaaki Takimoto, Asaka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed May 25, 1972, Ser. No. 256,862**
**Claims priority, application Japan, May 25, 1971, 46/35,814**
**Int. Cl. G03g *13/22***
**U.S. Cl. 96—1 R** **24 Claims**

A process for forming dye images comprising forming electrostatic latent images on a sheet comprising an electrophotographic sensitive layer composed of a finely-divided zinc oxide photoconductive powder and an insulating resin on a water-resistant support and converting said latent images into gelatin images by developing with an electrophotographic developer containing a finely-divided gelatin powder, fixing said gelatin images and hardening said gelatin images on said sheet, removing said photoconductive zinc oxide in said electrophotographic sensitive layer on said sheet and washing said electrophotographic sensitive layer on said sheet with water, soaking said sheet in an organic solvent which does not dissolve said water-resistant support and said insulating resin, placing said sheet wetted by said solvent so as to closely contact the support side with a metal plate maintained at a temperature ranging from a maximum of 60° C. above to a minimum of 20° C. below the boiling point of said solvent, whereby said organic solvent is evaporated, contacting said gelatin images on said sheet with an aqueous dye solution whereby the dye is absorbed into the gelatin images, removing excess dye solution from said gelatin images on said sheet by washing said sheet with an acid aqueous solution, and contacting said gelatin images with a dye receptive layer, whereby said dye is transferred from said gelatin images to said dye receptive layer, is disclosed.

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**3,788,846**

**METHOD FOR PRINTING NEGATIVE TOLERANCE MATRIX SCREEN STRUCTURE FOR A CATHODE-RAY TUBE**

**Edith Ellen Mayaud and Samuel Pearlman, Lancaster, Pa., assignors to RCA Corporation**

**Filed June 28, 1971, Ser. No. 157,502**
**Int. Cl. G03c *5/00***
**U.S. Cl. 96—36.1** **7 Claims**

A light-absorbing matrix is produced by under-exposing a film of light-sensitive material by projecting light through an apertured mask of the tube incident on the film from a small-area light source, developing the under-exposed film, using the developed film to produce a light-absorbing matrix, and then filling the holes in the matrix with phosphor material.

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**3,788,847**

**METHODS OF MANUFACTURE OF COLOR PICTURE TUBES**

**Richard Hugh Godfrey, Lancaster, Pa., assignor to RCA Corporation**

**Filed Jan. 14, 1972, Ser. No. 217,785**
**Int. Cl. G03c *5/00***
**U.S. Cl. 96—36.1** **9 Claims**

Two or more selected portions or zones of each color pattern of the mosaic screen of a shadow mask color picture tube are substantially separately printed in separate photographic exposures using different optical systems in the lighthouse, to provide different corrections for misregister in different zones. The different exposures involve first order color center printing in one zone and second order color center printing in another zone, with different light refracting correction elements in the two exposures, each element being designed to correct for misregister in the respective zone.

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**3,788,848**

**METHODS OF MANUFACTURE OF COLOR PICTURE TUBES**

**Albert Maxwell Morrell, Lancaster, Pa., assignor to RCA Corporation**

**Filed Jan. 14, 1972, Ser. No. 217,884**
**Int. Cl. G03c *5/00***
**U.S. Cl. 96—36.1** **11 Claims**

Two or more selected portions or zones of each color pattern of the mosaic screen of a shadow mask color picture tube are substantially separately printed in separate photographic exposures using different locations for the light source in the lighthouse, to provide different corrections for misregister in different zones. The different locations may involve different lateral spacing of light source from the central axis of the electron gun structure, or different distance between the light source and the mask, or both.

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**3,788,849**

**NEGATIVE-WORKING PHOTOGRAPHIC PROCESS UTILIZING HEAT BLEACHABLE THIN LAYER OF A DYE**

**Seiichi Taguchi and Eiichi Mizuki, Saitama, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**No Drawing. Filed Nov. 26, 1971, Ser. No. 202,577**
**Claims priority, application Japan, Nov. 26, 1970, 45/104,264**
**Int. Cl. G03c *1/12, 5/24***
**U.S. Cl. 96—48 HD** **12 Claims**

A process for forming an image comprising selectively exposing a portion of a light-sensitive material, which light-sensitive material comprises a support having thereon a thin layer of a dye which has an adsorption in the visible light region and which becomes stable to heat when it is exposed to light having a wavelength in the absorption region of the dye as compared to the unexposed state of the dye, to light of a wavelength in the absorption region of the dye and, simultaneously or immediately after exposure, heating the light-sensitive material to fade the dye at the unexposed areas.

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**3,788,850**

**SURFACE-ACTIVE COMPOUNDS FOR USE AS COATING AIDS FOR FILM-FORMING COATING COMPOSITIONS**

**Arthur Henri De Cat, Mortsel, Francis Jeanne Sels, Kontich, and Robert Joseph Pollet and Jozef Frans Willems, Wilrijk, Belgium, assignors to Agfa-Gevaert N.V., Mortsel, Belgium**

**No Drawing. Filed June 4, 1971, Ser. No. 150,196**
**Claims priority, application Great Britain, June 4, 1970, 27,049/70**
**Int. Cl. G03c *1/02, 1/38***
**U.S. Cl. 96—67** **14 Claims**

Coating compositions including a hydrophilic colloid and at least one compound of the formula:

$$R—(CH_2)_n—(OCH_2CH_2)_mOSO_3M$$

wherein:

*m* stands for 0 in which case *n* is 1 or *m* stands for 1 to 30 in which case *n* is 0 or 1,

M stands for hydrogen, an alkali metal atom, ammonium or organic ammonium, and

R stands for a branched-chain aliphatic group of 8 to 20 carbon atoms, which has at least 2 points of branching

are described. The coating compositions are particularly useful in the formation of photographic silver halide materials and the layers coated therefrom do not exhibit hydrophobic areas leading to repellency spots or comets.

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**3,788,851**

**SURFACE-ACTIVE COMPOUNDS USED AS COATING AIDS IN FILM-FORMING COMPOSITIONS**

**Jozef Frans Willems, Wilrijk, Francis Jeanne Sels, Kontich, Robert Joseph Pollet, Vremde, and Arthur Henri De Cat, Mortsel, Belgium, assignors to Agfa-Gevaert N.V., Mortsel, Belgium**

**No Drawing. Filed June 4, 1971, Ser. No. 150,199**
**Claims priority, application Great Britain, June 4, 1970, 27,081/70**
**Int. Cl. G03c *1/02, 1/38***
**U.S. Cl. 96—67** **10 Claims**

Coating compositions including a hydrophilic colloid and at least one compound of the formula:

$$R(-OCH_2CH_2)_m-X-A-SO_3M$$

wherein:

M stands for hydrogen, an alkali metal atom, ammonium or organic ammonium,
X stands for oxygen or sulphur,
A stands for alkylene comprising at least 3 C-atoms or for aralkylene,
R stands for a branched-chain aliphatic group of 10 to 20 carbon atoms, and
*m* stands for 0 to 30,

are described. The coating compositions are particularly useful in the formation of photographic silver halide materials and the layers coated therefrom do not exhibit hydrophobic areas leading to repellency spots or comets.

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**3,788,852**

**SURFACE-ACTIVE COMPOUNDS USED AS COATING AIDS FOR FILM-FORMING COATING COMPOSITIONS**

**Francis Jeanne Sels, Kontich, and Robert Joseph Pollet, Vremde, Belgium, assignors to Agfa-Gevaert N.V., Mortsel, Belgium**

**No Drawing. Filed June 4, 1971, Ser. No. 150,200**
**Claims priority, application Great Britain, June 4, 1970, 27,050/70**
**Int. Cl. G03c *1/02, 1/38***
**U.S. Cl. 96—67** **7 Claims**

Coating compositions including a hydrophilic colloid and at least one compound of the formula:

$$R-(OCH_2CH_2)_mOCO-A-SO_3M$$

wherein:

M stands for hydrogen, an alkali metal atom, ammonium or organic ammonium,
A stands for aralkylene or arylene,
*m* stands for 0 to 30, and
R stands for a branched-chain aliphatic group of 10 to 20 carbon atoms,

are described. The coating compositions are particularly useful in the formation of photographic silver halide materials and the layers coated therefrom do not exhibit hydrophobic areas leading to repellency spots or comets.

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**3,788,853**

**PHOTOGRAPHIC ELEMENTS COMPRISING COMPLEXES OF TITANIUM DIOXIDE AND AN ORGANIC LIGAND**

**Paul B. Gilman, Jr., and John A. Haefner, Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**No Drawing. Continuation of abandoned application Ser. No. 711,869, Mar. 11, 1968. This appplication Apr. 19, 1971, Ser. No. 135,394**
**Int. Cl. G03c *1/76***
**U.S. Cl. 96—69** **10 Claims**

Photographic elements incorporating a light-sensitive colored complex of titanium dioxide and an unsaturated organic ligand compound containing at least one polydentate chelating group, such as 8-hydroxy quinoline compounds, aromatic vicinal polyol compounds and the like unsaturated organic compounds having at least two closely positioned electron-donating atoms, can exhibit a sensitivity to visible light radiation which is of an efficiency equipment to the ultraviolet light sensitivity of unsensitized titanium dioxide. Aromatic vicinal polyols are preferred. Such sensitization occurs both with binderless, vacuum-deposited titanium dioxide and with particulate titanium dioxide which is dispersed in a binder material.

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**3,788,854**

**PHOTOGRAPHIC ELEMENT CONTAINING AN OIL-SOLUBLE VINYLENE BRIGHTENING AGENT**

**Robert J. Tuite, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**No Drawing. Continuation of abandoned application Ser. No. 847,404, Aug. 4, 1969. This application Jan. 31, 1972, Ser. No. 222,304**
**Int. Cl. G03c *1/92***
**U.S. Cl. 96—82** **15 Claims**

Hydrophilic colloids having intimately dispersed therein an essentially hydrophobic solid solution of an oil-soluble vinylene brightening agent in an essentially hydrophobic organic solvent that is rigid (an organic glass) at room temperature, i.e., has a glass transition temperature (Tg) that is above about 25° C. are advantageously used in photographic elements and in image-receiving elements for image diffusion transfer because the light-stability of the stilbene brightening agents in these dispersions is increased substantially over the light-stability of the same brightening agents in dispersions outside the immediate invention.

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**3,788,855**

**NOVEL POLYMERS AND PHOTOGRAPHIC ELEMENTS CONTAINING SAME**

**Hyman L. Cohen, James R. King, Jr., and Louis M. Minsk, all % Eastman Kodak Company, Rochester, N.Y. 14650**

**No Drawing. Application Dec. 21, 1970, Ser. No. 100,491, which is a continuation-in-part of abandoned application Ser. No. 709,812, Mar. 1, 1968. Divided and this application Nov. 9, 1971, Ser. No. 197,157**
**Int. Cl. G03c *1/84***
**U.S. Cl. 96—84 R** **16 Claims**

Polymers comprising quaternary nitrogen atoms and at least two aromatic nuclei in the polymer cation for each quaternary nitrogen atom are described. In one embodiment at least ⅓ of the units of said polymer comprise quaternary nitrogen atoms. In another embodiment polymers comprising at least two aromatic nuclei in the polymer cation, such as aryl groups, for each quaternary nitrogen atom can be used in photographic elements to provide excellent mordants for dyes.

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**3,788,856**

**PLURAL COATED SHEET MATERIAL CONTAINING PHOTOSENSITIVE SEMICONDUCTIVE PARTICLES**

**August Jean Van Paesschen, Antwerp, Lucien Janbaptist Van Gossum, Kontich, and Jan Josef Preim, Mortsel, Belgium, assignors to Agfa-Gevaert N.V., Mortsel, Belgium**

**No Drawing. Original application Sept. 27, 1968, Ser. No. 763,382, now Patent No. 3,649,336. Divided and this appplication July 23, 1971, Ser. No. 165,312**
**Claims priority, application Great Britain, Aug. 12, 1968, 44,114/68**
**Int. Cl. G03c *1/80***
**U.S. Cl. 96—87 R** **10 Claims**

Improved adherence is obtained for sheet material having a hydrophobic film support or base, such as a hydrophobic cellulose ester or poly ester, by the combination of a vinyl polymer subbing layer arranged directly on

the hydrophobic support, the subbing layer being formed of a copolymer containing at least 45% by weight of vinylidene chloride and/or vinyl chloride monomer along with a minor amount of a hydrophilic vinyl monomer with the balance being constituted by any other vinyl monomer, and superimposed upon the vinyl subbing layer a layer containing a mixture of gelatin with a copolymer of butadiene and a vinyl monomer containing 30–70% by weight of butadiene, the ratio of the gelatin to the butadiene copolymer being in the range of 1:3 to 2:1 by weight. An additional layer can be applied over the gelatin/copolymer layer and constituted by such ingredients as are desirable for the particular utility of the resultant sheet material, such as electrophotographic layers containing finely divided photoconductive material such as zinc oxide or some other photosensitive semi-conductive material, mat layers containing pigment, diffusion transfer layers containing development nuclei and so on. Alternatively, the ingredients appropriate to some particular ultimate utility can be incorporated into the gelatin/butadiene copolymer layer directly.

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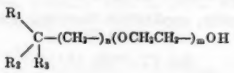
**3,788,857**

## METHOD OF INCORPORATING PHOTOGRAPHIC ADJUVANTS INTO HYDROPHILIC COLLOIDS

**Raphael Karel Van Poucke, Berchem, and Robert Joseph Pollet, Vremde, Belgium, assignors to Agfa-Gevaert N.V., Mortsel, Belgium**

**No Drawing. Filed June 4, 1971, Ser. No. 150,214**
**Claims priority, application Great Britain, Aug. 13, 1970, 39,116/70**
**Int. Cl. G03c *1/40***
**U.S. Cl. 96—100** **16 Claims**

A photographic chemical adjuvant is incorporated into a hydrophilic colloid composition by dispersing a solution of the chemical adjuvant in the hydrophilic colloid composition in the presence of a high-boiling substantially water-insoluble aliphatic alcohol or ethoxylated derivative thereof which corresponds to the formula:



wherein

$n$ is 0 or 1 and $m$ is 0 to 30,
$R_3$ is hydrogen or when $n$ is 1 may be alkyl, and
each of $R_1$ and $R_2$ stands for a straight-chain or branched-chain alkyl group or together represent the atoms necessary to complete an aliphatic ring structure, $R_1$ and $R_2$ together comprising at least 5 carbon atoms.

The colloid composition can be a light-sensitive silver halide emulsion or a non-light sensitive water-permeable colloid composition. The high boiling alcohols or ethoxylated derivatives thereof have the particular advantage of reducing the viscosity of the colloid compositions and maintaining the viscosity at a stable level.

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**3,788,858**

## PHOTOPOLYMERIZATION SYSTEMS WITH TETRAZOLIUM SALT

**John D. Margerum, Woodland Hills, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.**

**Continuation-in-part of abandoned application Ser. No. 227,955, Feb. 22, 1972. This application Oct. 2, 1972, Ser. No. 294,037**
**Int. Cl. G03c *1/70***
**U.S. Cl. 96—115 P** **7 Claims**

Photopolymerizable systems which combine an aromatic-substituted tetrazolium salt with a compound that is photopolymerizable by ultraviolet light are effective for initiating and effecting imaging recordings and for lithographic purposes.

**3,788,859**

## FINE GRAIN SILVER HALIDE PHOTOGRAPHIC EMULSION CONTAINING HEMICYANINE SENSITIZING DYE

**Yoshiyuki Nakazawa, Yoshuharu Nakamura, Tohru Sueyoshi, and Akira Sato, Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**No Drawing. Filed Oct. 7, 1971, Ser. No. 187,494**
**Claims priority, application Japan, Oct. 7, 1970, 45/88,133**
**Int. Cl. G03c *1/10, 1/22***
**U.S. Cl. 96—139** **8 Claims**

A hemicyanine dye is used to spectrally sensitize silver halide photographic emulsions to produce emulsions having high photosensitivity in the region of wavelengths of absorption intrinsic to silver halide and in the region of wavelengths of the dye.

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**3,788,860**

## PROCESS FOR PRODUCING COFFEE EXTRACT

**James Patrick Mahlmann, Wayne, N.J., assignor to General Foods Corporation, White Plains, N.Y.**

**No Drawing. Filed June 23, 1972, Ser. No. 265,891**
**Int. Cl. A23f *1/08***
**U.S. Cl. 426—433** **3 Claims**

A novel process for producing coffee extract by contacting progressively fresher roasted and ground coffee with an aqueous extraction liquid in the extraction columns of a percolator set is disclosed comprising contacting roasted whole coffee beans with the aqueous extraction liquid in the fresh stage of the percolator set from which coffee extract is drawn off, drawing off a quantity of coffee extract from the fresh stage thus completing a cycle, and then grinding the whole coffee beans at a point prior to contacting them with aqueous extraction liquid in the autoclave section of the percolator set.

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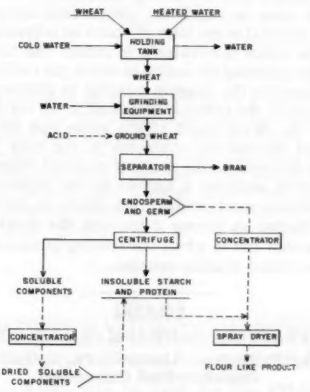
**3,788,861**

## HYDROMILLING OF WHEAT

**Jack R. Durst, Osseo, and William C. Winters, Minneapolis, Minn., assignors to The Pillsbury Company, Minneapolis, Minn.**

**Filed June 18, 1971, Ser. No. 154,538**
**Int. Cl. A23l *1/10***
**U.S. Cl. 426—385** **21 Claims**




A process for hydromilling wheat is provided by grinding the wheat kernels or berries in an aqueous medium containing 3.5 to about 15 parts by weight water per part by weight wheat at a temperature not exceeding 104° F. to reduce all of the components, except the wheat bran, to a particle size of less than 200 microns; separating the bran from the aqueous hydromilled wheat product containing the endosperm and germ components; and remov-

ing a portion of the water from the hydromilled wheat product. Throughout this process, substantially all of the starch granules are maintained in the intact, ungelatinized form and substantially all of the protein is maintained in an undenatured form, thereby providing a hydromilled wheat product having excellent doughing and baking properties.

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**3,788,862**

## PARTIALLY SIMULATED TOMATO PRODUCT

**Maurice W. Hoover and Rhea M. Hoover, both of 920 Merwin Road, Raleigh, N.C. 27606**

**No Drawing. Continuation of application Ser. No. 750,468, Aug. 6, 1968. This application Nov. 3, 1971, Ser. No. 195,380**

**Int. Cl. A23l** *1/00, 1/40*

**U.S. Cl. 426—177** **11 Claims**

A partially simulated tomato product comprising tomato solids, an admixture of starch, de-oiled soy meal and animal protein, sweetening agents, and edible organic acid crystals.

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**3,788,863**

## AQUEOUS INK FOR DEVELOPMENT OF CONCEALED IMAGES

**Raymond I. Scheuer, 807 Pear Ave., Sunnyvale, Calif. 94087**

**Original application Sept. 3, 1968, Ser. No. 757,067. Divided and this application May 26, 1971, Ser. No. 147,028**

**Int. Cl. C09d** *11/00, 11/14*

**U.S. Cl. 106—21** **2 Claims**

A system for the preparing of copy containing concealed images and a marking material for the development of same in which the components comprise a receiving material in the form of starch or polyvinyl alcohol, an iodide which is oxidizable to iodine, and an oxidizing agent for oxidizing the iodide in which the oxidizing agent is contained in the imaging material to produce the concealed image, the iodine is contained in the marking material for the development of the image and the starch of polyvinyl alcohol are contained in the copy sheet, the printing material or the marking material whereby, when the marking material is applied to the concealed image, the oxidizing agent oxidizes the iodide to release iodine for producing an intense color with the starch or polyvinyl alcohol and in which the printing process is adapted to conventional printing systems.

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**3,788,864**

## REFRACTORY SAND MOLDS AND CORES

**Paul F. Stephens, Allentown, Pa., assignor to Bethlehem Steel Corporation**

**No Drawing. Continuation of application Ser. No. 130,447, Apr. 1, 1971, which is a continuation-in-part of application Ser. No. 35,945, May 8, 1970, which in turn is a continuation-in-part of application Ser. No. 799,551, Feb. 13, 1969, all now abandoned. This application Aug. 9, 1972, Ser. No. 275,651**

**Int. Cl. B28b** *7/28*

**U.S. Cl. 106—38.3** **2 Claims**

A refractory mold and/or core suitable for casting molten ferrous metal and molten non-ferrous metal of the high lead and/or high tin copper alloys characterized by having a permeability of not more than 10 when tested by standard AFS permeability test comprising chromite sand, chromite flour and clay binder.

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**3,788,865**

## CRYSTALLIZED GLASS CERAMICS AND PROCESS FOR FORMING SAME

**Clarence L. Babcock, 1718 Potomac, Toledo, Ohio 43607; Robert A. Busdiecker, 414 W. 1st St., Woodville, Ohio 43469; and Erwin C. Hagedorn, 513 Ansonia, Oregon, Ohio 43616**

**Continuation of application Ser. No. 464,147, June 15, 1965, which is a continuation-in-part of application Ser. No. 386,693, July 31, 1964, both now abandoned. This application Sept. 8, 1970, Ser. No. 70,500**

**Int. Cl. C03c** *3/04, 3/20, 3/22*

**U.S. Cl. 106—39.7** **27 Claims**

Colored and/or transparent, low-expansion, crystallized glass-ceramics formed by thermal in situ crystallization from a differently colored crystallizable base glass and having lithium-containing crystals as the predominant crystalline species. The products have coefficients of thermal expansion of less than about $12\times10^{-7}$ per ° C. over the range of 0 to 300° C. Telescope mirror blanks can be made from the transparent, low-expansion, crystallized glass ceramics.

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**3,788,866**

## METHOD OF PRODUCING REFRACTORY MATERIAL

**Hakon Flood, Trondheim, and Arne Seltveit, Moholtan, Norway, assignors to Elkem A/S, Oslo, Norway**

**No Drawing. Continuation-in-part of abandoned application Ser. No. 246,466, Apr. 21, 1972. This application Oct. 2, 1972, Ser. No. 294,275**

**Claims priority, application Norway, Apr. 26, 1971, 1,540/71**

**Int. Cl. C04b** *35/14*

**U.S. Cl. 106—69** **9 Claims**

A method of producing silica refractory materials is disclosed. Finely divided silica is admixed with water and then lime is added to the mixture. Thereafter a proper ammonium compound is added to precipitate calcium as a compound insoluble in water after which the product is baked preferably first at a low temperature for a relatively long period of time and then at a high temperature for a shorter period of time.

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**3,788,867**

## $BaTiO_3$-MgO-$Nb_2O_5$ DIELECTRIC CERAMIC COMPOSITIONS AND METHOD

**Truman C. Rutt, Niagara Falls, N.Y., assignor to N. L. Industries, Inc., New York, N.Y.**

**Filed Nov. 1, 1971, Ser. No. 194,457**

**Int. Cl. C04b** *33/26, 35/46*

**U.S. Cl. 106—73.31** **8 Claims**

Bismuth-free, dielectric ceramic compositions consisting essentially of from approximately 97 mol percent to approximately 82 mol percent $BaTiO_3$, the balance being MgO and $Nb_2O_5$ in a mol ratio of from about 1:1 to 1:2, may be fired at temperatures in the range from about 1300° C. to 1400° C. to produce useful dielectric ceramic bodies including monolithic capacitors. The resultant bodies have relatively low temperature coefficients, low dissipation factors, and vary in relative permittivity from

about 300 to about 2000. The permittivity may be controlled by adjusting the mol percentage of MgO and $Nb_2O_5$ in the composition.

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**3,788,868**
**METHOD FOR MAINTAINING FLUIDITY OF CEMENT COMPOSITIONS**
**Toshiyuki Kitsuda, Yokohama, Choji Yamakawa, Wakayama, and Kenichi Hattori, Tokyo, Japan, assignors to Kao Soap Co., Ltd. and Japanese National Railways, Tokyo, Japan**
**Filed Dec. 19, 1972, Ser. No. 316,493**
**Claims priority, application Japan, Dec. 25, 1971, 46/1,134**
**Int. Cl. C04b 7/02**
**U.S. Cl. 106—90** **7 Claims**

The fluidity of cement compositions can be maintained by adding to the cement composition a non-retarding, non-air-entraining cement dispersing agent selected from the group consisting of (a) water-soluble salts of condensates having molecular weights of not less than 1500, and obtained by condensing with formaldehyde sulfonated products of monocyclic or fused polycyclic aromatic benzenoid hydrocarbon compounds and (b) water-soluble salts of sulfonated products of fused polycyclic aromatic benzenoid hydrocarbon compounds having at least 3 benzene rings, the dispersing agent being added at at least two chronologically spaced intervals or continuously so that the fluidity of the cement composition can be maintained over an extended period of time.

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**3,788,869**
**CONCRETE COMPOSITIONS OR MIXES AND ADDITIVE THEREFOR**
**Jack B. Batdorf and Steven M. Weiss, Wilmington, Del., assignors to Hercules Incorporated, Wilmington, Del.**
**No Drawing. Continuation-in-part of abandoned application Ser. No. 112,029, Feb. 2, 1971. This application Jan. 11, 1972, Ser. No. 317,551**
**Int. Cl. C04b 7/02**
**U.S. Cl. 106—93** **4 Claims**

Disclosed are hydroxyethyl cellulose (HEC) as additive for concrete compositions or mixes, substantially dry concrete compositions comprising conventional ingredients plus HEC, and concrete compositions comprising conventional ingredients (including water) plus HEC. The HEC renders the concrete compositions (when water is added thereto) readily pumpable and gives percent total air values within American Concrete Institute specifications.

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**3,788,870**
**XYLOLITH BUILDING BOARDS AND SHEETS**
**Joachim Zur Verth and Franz Prymelski, Hamburg, Germany, assignors to Joachim Zur Verth, Hamburg, Germany**
**No Drawing. Filed July 14, 1971, Ser. No. 165,811**
**Claims priority, application Germany, July 16, 1970, P 20 35 265.2**
**Int. Cl. C04b 3/00**
**U.S. Cl. 106—108** **4 Claims**

Self-supporting, non-combustible xylolith building boards and sheets characterized by their excellent screw retaining capacity and size and shape retention and having a ratio of $MgO:MgCl_2$ of 2:4 composed of a mixture of natural and synthetic magnesite, finely divided wood filler materials and a magnesium chloride solution of 10 to 15° Bé. having a density at the highest of 0.75 g./cm.$^3$ and a weight ratio of MgO:wood shavings and chips of 1:1 to 1:1.15 which has been hardened at a temperature between 30 and 65° C. without pressing.

**3,788,871**
**PEARLESCENT PIGMENT**
**Norbert V. Mullio, Brooklyn, N.Y., assignor to Whittaker Corporation**
**No Drawing. Filed Mar. 22, 1971, Ser. No. 127,016**
**Int. Cl. C09c 1/00**
**U.S. Cl. 106—291** **14 Claims**

Mica platelets are coated with bismuth oxychloride crystals to provide pearlescent pigments which are especially useful in cosmetic applications. The pigments are produced by impregnating mica platelets with hydrochloric acid, followed by hydrolysis of bismuth trichloride in the presence of the platelets. The hydrolysis reaction is effected while the impregnated platelets are suspended in an aqueous crystallization medium, and hydrolysis results in the formation of bismuth oxychloride crystals which deposit on the surface of the mica. In preferred embodiments of the process, bismuth trichloride is contained in the hydrochloric acid with which the mica is impregnated. In comparison to conventional bismuth oxychloride pigments which contain no mica, these new products are superior in many respects, and equivalent pearlescence and opacity can be provided by a substantially lesser amount of bismuth oxychloride.

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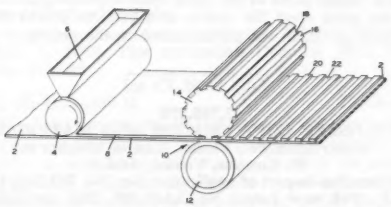
**3,788,872**
**METHOD OF EMBOSSING**
**Daniel M. Sigman, Jr., Strasburg, Pa., assignor to Armstrong Cork Company, Lancaster, Pa.**
**Filed Nov. 8, 1971, Ser. No. 196,394**
**Int. Cl. B44c 1/02**
**U.S. Cl. 117—10** **9 Claims**



A layer of liquid material is placed on a backing sheet. The backing sheet and liquid layer pass through an embossing structure which fuses or gels the liquid layer to place it in a solid or semi-solid state. The raised areas of the embossing roll press down against the liquid layer and engage the backing sheet to form areas where the liquid has been completely squeezed out from between the backing sheet and the raised area of the embossing roll.

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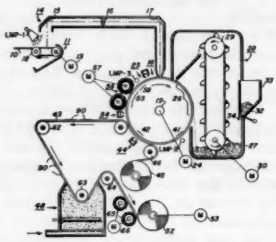
**3,788,873**
**FIXING METHOD UTILIZING INTERMEDIATE HEAT TRANSFER**
**Robert H. Detig, Old Tappan, N.J., assignor to Xerox Corporation, Rochester, N.Y.**
**Original application Oct. 30, 1969, Ser. No. 872,558, now Patent No. 3,623,710. Divided and this application Mar. 2, 1971, Ser. No. 120,143**
**Int. Cl. G03g 13/20, 15/70**
**U.S. Cl. 117—21** **1 Claim**

A method for affixing electroscopic toner images onto a support by utilizing an intermediary as a heat transfer medium. A quantity of particulate material is heated to a temperature sufficient to produce at least a partial melting of the particular toner material to be fused and the toner

material on the support is then contacted with the heated particulate material to induce a transfer of the thermal



energy in the particulate material to the toner material on the support.

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**3,788,874**

## LOW POROSITY COATING AND METHOD FOR PRODUCING SAME

**William B. Crandall, Wheaton, Ill., and Charles M. Lee, Jr., Luthersburg, Pa., assignors to Sybron Corporation, Rochester, N.Y.**

**Filed Nov. 29, 1971, Ser. No. 202,840**
**Int. Cl. B44c *1/06***
**U.S. Cl. 117—23** **9 Claims**

A low porosity glass coat is applied to an article by maintaining the article at a temperature at least as high as the fusion point of the glass while depositing particles of the glass upon the article at a rate no greater than the rate at which the particles fuse to the article.

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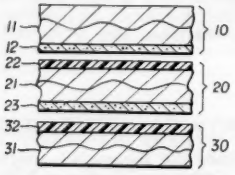
**3,788,875**

## TRANSFER COPY PROCESS AND MATERIAL

**Walter Schutzner, Vienna, Austria, assignor to W. Koreska, Vienna, Austria**

**Continuation-in-part of application Ser. No. 768,346, Oct. 17, 1968, now Patent No. 3,640,750. This application July 16, 1971, Ser. No. 163,482**
**The portion of the term of the patent subsequent to Feb. 8, 1989, has been disclaimed**
**Int. Cl. B41m *5/22***
**U.S. Cl. 117—36.2** **3 Claims**



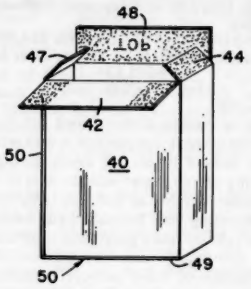

An upper sheet and a lower sheet, adapted to be superimposed to form an interface between the sheets, are coated on said interface with respective ingredients for a heat-induced, color-producing chemical reaction. The transfer layer has a synthetic-resin body while the receptor layer has a wax base with a softening point below the activation temperature of the reaction.

**3,788,876**

## CARTON BLANKS PRINTED WITH A HEAT SEALABLE COMPOSITION AND METHOD THEREOF

**David R. Baker and Robert I. Yin, Concord, Calif., assignors to Fibreboard Corporation, San Francisco, Calif.**

**Filed July 16, 1971, Ser. No. 163,335**
**Int. Cl. A61j *15/06*; B44d *1/02***
**U.S. Cl. 117—38** **9 Claims**




By employing a mixture of powdered polyethylene and an ethylene based ionic polymer in an aqueous emulsion a composition can be formed which can be printed directly on paperboard webs in the locations of the tab and flap areas of a carton blank are subsequently cut therefrom whereby a carton blank is formed which is compatible with high speed barriermatic hot air sealing machines commonly used for fabricating and sealing polyethylene coated carton blanks.

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**3,788,877**

## METHOD FOR PRODUCING ADHERENT, DUCTILE ZINC COATING ON FERROUS SUBSTRATES BY VACUUM DEPOSITION

**Lawrence E. Helwig, Hampton Township, Allegheny County, and Michael V. Murray, Monroeville, Pa., assignors to United States Steel Corporation**

**No Drawing. Filed July 20, 1972, Ser. No. 273,573**
**Int. Cl. C23c *13/02***
**U.S. Cl. 117—62** **5 Claims**

A Zn coating of up to seven mils thickness is deposited on a conventionally cleaned, ferrous substrate by condensation of Zn vapors in vacuo. To make the coating adherent, it is passed out of the vacuum chamber and rapidly heated to a temperature of 750° F.–1000° F. and then immediately quenched. The elapsed time from beginning of heating to the conclusion of the quenching must be no greater than about 25 seconds.

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**3,788,878**

## IMPREGNATING NONWOVENS WITH AN ALKYL ACRYLATE POLYMER-CARBOXYLIC POLYMER LATEX

**George L. Wheelock, Avon Lake, Ohio, assignor to The B. F. Goodrich Company, New York, N.Y.**

**No Drawing. Continuation-in-part of abandoned application Ser. No. 725,152, Apr. 29, 1968. This application July 14, 1972, Ser. No. 272,094**
**Int. Cl. B44d *1/48***
**U.S. Cl. 117—62.2** **12 Claims**

A process for obtaining nonwoven materials having improved physical properties, especially internal bond

strength or delamination resistance and wet tensile strength, is provided. The nonwoven fabrics and papers are impregnated with an alkyl acrylate polymer latex containing carboxyl functionality and exposed to ammonia or amine vapors prior to the drying and curing operations to obtain the improved properties. Papers treated in this manner have shown up to a two-fold increase in internal bond strength.

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**3,788,879**

## ROAD MARKING

**Simon S. Waysman, Ganei Yehuda, Israel, assignor to Koor Chemicals Ltd., Beer-Sheva, Israel**

**Filed July 19, 1971, Ser. No. 163,986**
**Claims priority, application Israel, Aug. 6, 1970, 35,067**
**Int. Cl. C09j** *7/04*
**U.S. Cl. 117—68.5** **2 Claims**

A marker sheet for making road surface markings consists of a mat of mineral fibers such as glass fibers, slag wool or asbestos, impregnated on its upper side with a pigmental thermoplastic resin and on its underside with an adhesive bituminous cement capable of sticking to the road surface, and the edges of the mat are left free of the impregnating compositions at least at two opposite sides. These free edges form tongues which are glued to the road surface when the sheets are laid thereon, and into which the adhesive bituminous cement overflows under pressure. The adhesive cement may be divided into a central zone and marginal ("sealing") zones.

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**3,788,880**

## METHOD OF INHIBITING CORROSION OF METAL SURFACES

**Ewald Mensenkamp, Rheinhausen, and Phil Heinrich Cordes, Wolfenbutel, Germany, assignors to Stahlwerke Peine-Salzgitter AG, Gerhardstrasse, Germany**

**No Drawing. Filed Jan. 20, 1972, Ser. No. 219,520**
**Claims priority, application Germany, Jan. 26, 1971, P 21 03 342.1**
**Int. Cl. B44d** *1/14*
**U.S. Cl. 117—70 S** **10 Claims**

A metal surface, e.g. of brass, is coated with a precipitate of a corrosion-retarding inorganic salt (e.g. a calcite) from water (preferably ordinary utility water containing the salt and under the electrochemical effect of local polarity differences along the metal body), whereupon the corrosion-inhibiting layer is used to bond, by ion-exchange interaction, an ion-exchange substance to the surface. Together, the corrosion-inhibiting and ion-exchange substances (a zeolite, natural or synthetic) form a three-dimensional stable coating which is adherent and prevents localized corrosion.

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**3,788,881**

## INK RECEIVING MATTE SHEET MATERIALS OVERCOATED WITH ALKYLATED VINYL-PYRROLIDONE POLYMERS

**Jacques C. T. Tellier, Conklin, N.Y., assignor to GAF Corporation, New York, N.Y.**

**No Drawing. Filed Nov. 3, 1971, Ser. No. 195,469**
**Int. Cl. B32b** *27/36*
**U.S. Cl. 117—73** **11 Claims**

Ink-receiving matte sheet materials, comprising a polyester base support precoated with a cellulosic film-forming polymer and thereafter overcoated with a composition comprising an alkylated vinylpyrrolidone polymer.

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**3,788,882**

## SYNTHETIC COMPOSITE AND PROCESS FOR PREPARING

**Thomas M. Noone, Oak Park, Ill., assignor to The Richardson Company, Melrose Park, Ill.**

**No Drawing. Original application Feb. 18, 1970, Ser. No. 12,467, now Patent No. 3,674,547, dated July 4, 1972. Divided and this application June 23, 1972, Ser. No. 266,969**
**Int. Cl. B32b** *27/40*
**U.S. Cl. 117—76 T** **10 Claims**

Breathable synthetic composites for articles of clothing including shoe uppers are provided by laminates composed of open-cell synthetic foams, a polyurethane film and a plasticizer which renders the synthetic composite resistant to liquid water transfer while allowing water-vapor transfer through the composite. A particularly useful composite comprises a polyvinyl chloride, open-cell foam and a thermoplastic polyurethane film containing a plasticizer such as tri-butoxyethyl phosphate to improve moisture-vapor transmission properties of the composite while maintaining a sufficient barrier to liquid water.

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**3,788,883**

## RAILROAD BALLAST CONSTRUCTION AND COMPOSITIONS OF MATTER FOR RAILROAD BALLAST CONSTRUCTION

**Fritz S. Rostler, Alameda County, Richard M. White, Contra Costa County, and Jack W. Newton, Alameda County, Calif., assignors to Phillips Petroleum Company, Bartlesville, Okla.**

**Continuation of abandoned application Ser. No. 773,186, Nov. 4, 1968. This application Dec. 23, 1971, Ser. No. 211,705**
**Int. Cl. B44d** *1/02*
**U.S. Cl. 117—100 R** **22 Claims**

This invention relates to bonding of rock aggregates by means of an elastomer bonding agent and relates particularly to railroad bed construction in which the ballast is bonded by means of an elastomer bond between the individual rock particles of the aggregate, and to methods of construction, and to compositions of matter useful for producing said elastomeric bond.

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**3,788,884**

## TEXTILE MATERIAL COATED WITH A WATERPROOFING AGENT

**André Bernard, Pierre Gagne, and Georges Gras, Villeurbanne, and Jean Neel, Lyon, France, assignors to Societe Civile dite Soltex, Paris, France**

**No Drawing. Original application Dec. 16, 1969, Ser. No. 885,620. Divided and this application Feb. 16, 1971, Ser. No. 115,805**
**Claims priority, application France, Dec. 19, 1968, 50,775; Nov. 6, 1969, 6938618**
**Int. Cl. B44d** *1/02*
**U.S. Cl. 117—121** **2 Claims**

Compounds of the formula

B—CO—NH—R—NH—CO—A

[where R is tolylene or hexamethylere; A and B are $NHR_1$, $NHR_2$, $N(R_1)_2$, $N(R_2)_2$, $OR_1$, $OR_2$, $R_1$ or $R_2$; and $R_1$ and $R_2$ are aliphatic hydrocarbon radicals of 12–22 carbon atoms] are crosslinked on textile fabrics with isocyanates to provide effective and long lasting waterproofing of the fabric.

3,788,885
## FIBROUS MATERIALS
James Derek Birchall and John Edward Cassidy, Runcorn, England, assignors to Imperial Chemical Industries Limited, London, England
No Drawing. Continuation-in-part of abandoned application Ser. No. 42,499, June 1, 1970, and a continuation of application Ser. No. 274,964, July 25, 1972. This application Nov. 29, 1971, Ser. No. 203,084
Claims priority, application Great Britain, Dec. 11, 1970, 59,040/70
Int. Cl. B32b *17/00, 19/00;* C07f *5/06*
U.S. Cl. 117—126 AF 20 Claims

Inorganic fibrous materials are bound together in felted form by treatment with a solution of either

(i) a complex phosphate of aluminum containing at least one chemically-bound molecule of a hydroxy compound, ROH, wherein R is an organic group or hydrogen and an anionic group of a strong inorganic acid, other than an oxyphosphorus acid, or of a carboxylic acid, or

(ii) an aluminum phosphate in which the ratio of the number of gram atoms of aluminum to the number of gram atoms of phosphorus is at least 1:1,

and then heating an entangled mass of the fibres so as to deposit aluminum phosphate from the solution.

3,788,886
## METHOD FOR PRODUCING AN OPAQUE COATING
Ehrlich M. Eiland, Lower Burrell, Pa., assignor to Aluminum Company of America, Pittsburgh, Pa.
No Drawing. Continuation of abandoned application Ser. No. 781,977, Dec. 6, 1968. This application Aug. 10, 1971, Ser. No. 170,647
Int. Cl. B32b *15/08;* B44d *5/06*
U.S. Cl. 117—132 BF 4 Claims

A process for producing an opaque coating on a substrate comprising applying to said substrate a composition comprising mineral spirits or Stoddard solvent, cellulose acetate butyrate or cellulose acetate propionate having an hydroxyl content of about 4.5%, a urea-formaldehyde or melamine polymer, a cross-linking catalyst, a plasticizer, and a lacquer solvent and curing said composition on said substrate by heating.

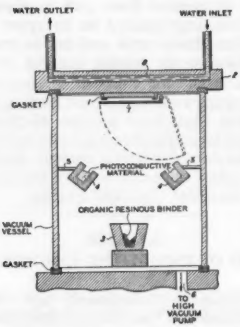
3,788,887
## FIBER FLEECES AND SYNTHETIC LEATHERS
Harro Traubel, Leverkusen, Karl-Arnold Weber, Cologne, and Otto Koch and Klaus Konig, Leverkusen, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany
No Drawing. Filed July 9, 1971, Ser. No. 161,351
Claims priority, application Germany, July 11, 1970, P 20 34 537.3
Int. Cl. C09d *5/00*
U.S. Cl. 117—135.5 8 Claims

Bonded fiber fleeces are provided and a method for their production which comprises preparing a reactive polyaddition reaction mixture from an organic polyisocyanate, and an organic compound containing at least two hydroxyl or amino hydrogen atoms capable of reacting with NCO groups as starting components in an inert liquid organic solvent for the starting components which boils at a temperature of below about 250° C. but which is a non-solvent for the polyaddition product, which solvent has no significant swelling effect on a homogeneous, non-porous film of the polyaddition product and is present in a quantity which does not exceed that which the polyaddition product is capable of enclosing as an internal phase, applying the reactive mixture to an unbonded fleece in a quantity sufficient to yield from 10 to 500% by weight based on the weight of the fleece of the polyaddition product and terminating the polyaddition reaction at a temperature of from about 20° to about 200° C. while evaporating the solvent.

3,788,888
## FIBER-LUBRICANT COMPOSITION
Hideo Kawanaka, Kenichi Katabe, and Seizi Kameda, Wakayama, Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan
No Drawing. Filed Apr. 16, 1971, Ser. No. 134,858
Claims priority, application Japan, Apr. 24, 1970, 45/35,215
Int. Cl. C08j *1/44*
U.S. Cl. 117—139.5 A 2 Claims

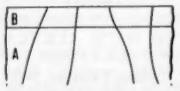
A fiber-lubricant composition containing a copolymer of a sulfonated product of naphthalene or a naphthalene derivative with an aldehyde, or a maleic anhydride polymer or copolymer, which composition can be advantageously used as the spin finish for staple in high speed spinning of synthetic fibers.

3,788,889
## METHOD OF PREPARING BINDER LAYERS
John Charles Schottmiller, Penfield, N.Y., and Charles Wood, Sycamore, Ill., assignors to Xerox Corporation, Stamford, Conn.
Continuation-in-part of abandoned application Ser. No. 631,089, Apr. 14, 1967. This application Dec. 9, 1970, Ser. No. 96,398
Int. Cl. G03g *5/08*
U.S. Cl. 117—201 12 Claims




This invention relates to a process for producing a photosensitive member comprising co-evaporating a photoconductive material and an organic resinous binder and depositing upon a conductive backing member a thin layer of photoconductive material dispersed throughout the organic resinous binder material.

3,788,890
## METHOD OF PREPARING DISLOCATION-FREE CRYSTALS
Siegfried R. Mader, Stuttgart, Germany, and John W. Matthews, Ossining, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.
Filed Mar. 3, 1972, Ser. No. 231,695
Int. Cl. B44c *1/18;* C23c *11/00*
U.S. Cl. 117—201 11 Claims




Disclosed is a method for growing crystals upon nonidentical substrate or seed crystals in which the grown crystals have a high degree of crystal perfection. More particularly, the invention includes a method of selecting

suitable seed or substrate crystals which permit the growth of dislocation-free crystals, a method of selecting the optimum plane on which to grow the crystal as well as approximating a large number of suitable planes, and then growing the crystal to a minimum thickness at which all dislocations are removed from the growing crystal. This invention is particularly applicable to the growth of dislocation-free thin film crystals since the minimum thickness can be readily calculated and is often quite small.

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**3,788,891**

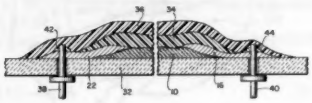
**THICK FILM PRECISION RESISTOR FOR USE IN AN ELECTRICAL CIRCUIT AND METHOD OF MAKING SAME**

**Sergei Schebalin, Ambler, Pa., assignor to Honeywell Inc., Minneapolis, Minn.**

**Filed Mar. 2, 1971, Ser. No. 120,199**

**Int. Cl. H01c *7/00***

**U.S. Cl. 117—212** **12 Claims**



A thick film resistor is formed by #1 firing selected mixtures of positive and negative thick film resistor ink materials on a non-electrically conductive substrate at a selected high temperature and #2 subsequently jointly firing the resistor and conductor ink material associated with this resistor, at a temperature that is lower than the first mentioned temperature and which is at a level that will not allow any detrimental diffusion, to occur between the conductor and the resistor materials. This unique process of firing achieves for the first time a successful method of firing a resistor and conductor jointly without allowing any adverse change to occur in the value of the temperature coefficient of resistivity and the resistivity value of the resistor.

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**3,788,892**

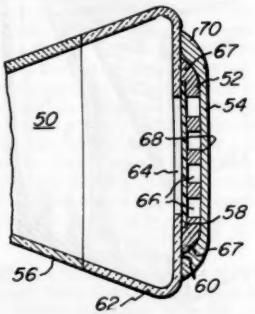
**METHOD OF PRODUCING A WINDOW DEVICE**

**John A. van Raalte, Princeton, and Victor Christiano, Trenton, N.J., assignors to RCA Corporation**

**Filed May 1, 1970, Ser. No. 33,699**

**Int. Cl. B29c *13/00, 17/08;* H01j *33/04***

**U.S. Cl. 117—212** **3 Claims**




A method of producing a window device that includes an envelope portion having a wall that includes an opening by: closing the opening with rigid temporary film; then producing a layer of solid window material over the temporary film, by parts of the layer extending beyond the temporary film and bonded to the surrounding envelope portion; and then removing the temporary film.

The window device can also include a rigid foraminous reinforcing member.

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**3,788,893**

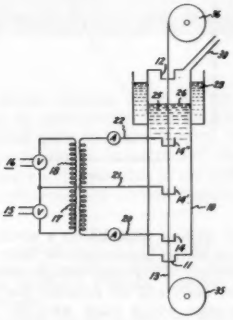
**COATED FILAMENTS**

**Charles R. Morelock, Ballston Spa, N.Y., assignor to General Electric Company**

**Application Jan. 13, 1971, Ser. No. 106,261, now Patent No. 3,738,314, which is a division of application Ser. No. 714,853, Mar. 21, 1968, now Patent No. 3,565,683. Divided and this application Feb. 9, 1972, Ser. No. 224,705**

**Int. Cl. C23c *11/02***

**U.S. Cl. 117—216** **1 Claim**



A tungsten carbide coating is deposited upon the electrically heated surface of a pyrolytic carbon coated fused silica or quartz fiber as it is passed through a liquid thermally decomposable tungsten compound such as tungsten hexachloride dissolved in a non-polar organic solvent such as benzene.

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**3,788,894**

**METHOD OF MANUFACTURING AN MNOS STORAGE ELEMENT**

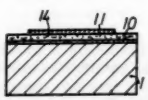
**Werner Scherber, Nordheim, Germany, assignor to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt am Main, Germany**

**Filed Dec. 23, 1971, Ser. No. 211,612**

**Claims priority, application Germany, Dec. 24, 1970, P 20 63 726.7**

**Int. Cl. C23c *11/14;* H01g *7/00***

**U.S. Cl. 117—217** **5 Claims**




A method of manufacturing an MNOS storage element including forming an oxide layer by glow discharge treatment of the semiconductor body in oxygen, forming a

nitride layer on the oxide layer by glow discharge treatment from the gases $SiH_4$ and $N_2$ and forming a metal layer on the nitride layer as a gate electrode.

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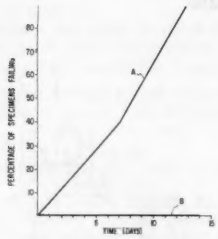
**3,788,895**

**METHOD FOR PRODUCING A STABLE SURFACE PROTECTION FOR SEMICONDUCTOR COMPONENTS**

**Rigobert Schimmer and Jurgen Messerschmidt, Belecke, Germany, assignors to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt am Main, Germany**

**Filed Apr. 21, 1971, Ser. No. 136,223**
**Claims priority, application Germany, Apr. 21, 1970, P 20 19 099.2**
**Int. Cl. H01l *3/00***
**U.S. Cl. 117—218** **22 Claims**




A polymer coating disposed on a semiconductor body and connected to the semiconductor body by a coupling compound having functional groups reacting with the semiconductor body and the polymer coating. Exemplary functional groups which react with the semiconductor body are, e.g., methoxy, ethoxy and acetoxy groups; these are regarded as anorganic-functional groups. Exemplary functional groups which react with the polymer coating are, e.g. vinyl, amino, alkylamino, arylamino, epoxy and mercapto groups; these are regarded as organo-functional groups.

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**3,788,896**

**METHOD FOR PRODUCING BUBBLE DOMAINS IN MAGNETIC FILM-SUBSTRATE STRUCTURES**

**Jack E. Mee, Anaheim, and Paul J. Besser, Mission Viejo, Calif., assignors to North American Rockwell Corporation, El Segundo, Calif.**

**Filed Dec. 28, 1970, Ser. No. 101,787**
**Int. Cl. H01f *10/06***
**U.S. Cl. 117—235** **5 Claims**

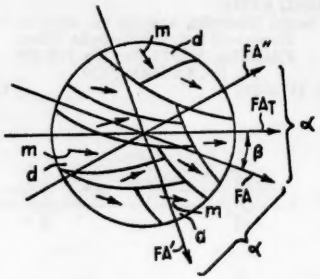
A method for producing a bubble domain in a magnetic single crystal garnet film-substrate structure is disclosed. The method involves the epitaxial deposition of an iron garnet film of the proper orientation and having a negative magnetostriction constant on a garnet substrate in which the room temperature lattice constant of the film is larger than the room temperature lattice constant of the substrate by an amount greater than about 0.035 angstrom.

**3,788,897**

**PROCESS FOR TREATING SUBSTRATES IN ORDER TO REDUCE THE MAGNETIC ANGULAR DISPERSION OF THIN FERROMAGNETIC FILMS DEPOSITED ON SUCH SUBSTRATES**

**Rene Fernand Victor Girard and Marie-Claire Gidon, Grenoble, France, assignors to Societe Industrielle Bull-General Electric (Societe Anonyme), Paris, France**

**Filed June 9, 1970, Ser. No. 44,707**
**Claims priority, application France, June 11, 1969, 6919286**
**Int. Cl. H01f *10/00***
**U.S. Cl. 117—236** **4 Claims**




A process for treating the substrate of a thin magnetic film to obtain a surface state which reduces the magnetic angular dispersion of the film, wherein, prior to being coated with the magnetic film, the substrate is immersed in an aqueous solution of palladium chloride and dissolved hydrogen chloride gas.

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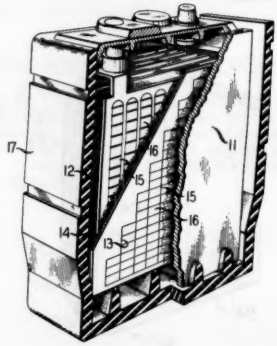
**3,788,898**

**FABRICATION OF NEGATIVE ELECTRODES IN LEAD-ACID BATTERIES**

**Charles Frederick Yarnell, Somerville, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Continuation of application Ser. No. 96,520, Dec. 9, 1970, which is a continuation-in-part of application Ser. No. 34,705, May 5, 1970, both now abandoned. This application June 7, 1972, Ser. No. 260,505**
**Int. Cl. H01m *39/00***
**U.S. Cl. 136—27** **6 Claims**




A method is described for producing the negative (Pb) electrode of a lead-acid battery. These negative electrodes are prepared by electrolytic reduction of tetrabasic lead

sulfate ($4PbO \cdot PbSO_4$) to which a small amount of expander has been added. There are several advantages to using tetrabasic lead sulfate as the paste material for negative electrodes. For example, it can be synthesized in large batch quantities outside the battery grid where reaction conditions can be precisely controlled. It can be characterized and specified as a unique chemical compound. It can be stored for long periods without deterioration. Acid need not be added in making the paste material from the tetrabasic lead sulfate. The pasted negative plates are cured by simple air drying with little control of temperature or humidity to produce plates without cracks.

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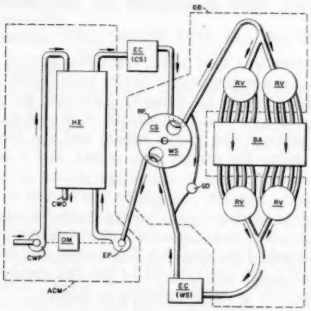
**3,788,899**
**ELECTROCHEMICAL POWER GENERATION APPARATUS AND METHODS**
**Solomon Zaromb, 376 Monroe St., Passaic, N.J. 07055**
**Continuation-in-part of application Ser. No. 633,348, Apr. 12, 1967, now Patent No. 3,554,810, and a continuation-in-part of abandoned application Ser. No. 5,340, Mar. 16, 1970. This application Dec. 24, 1970, Ser. No. 101,284**
**The portion of the term of the patent subsequent to Jan. 12, 1988, has been disclaimed**
**Int. Cl. H01m *27/12, 29/04***
**U.S. Cl. 136—86 A** **18 Claims**



A power source comprises an electrochemical battery cell including an anode and an oxygen or hydrogen peroxide depolarized cathode, a liquid electrolyte solution, electrolyte circulation means, an electrolyte container, and means to produce changes in the volumes of electrolyte in said container and in said battery cell and thereby control the current density at the surfaces of said anode and cathode. The anode may be of a consumable metal type, especially of aluminum. The volume changes may be effected by expanding or collapsing a reversibly expansible pocket in said electrolyte container. When several battery cells are connected in series, electrical current leakage paths through the electrolyte circulation means are blocked by a system of valves which sequentially and intermittently connect one of said cells at a time to said circulation means. Heat exchange apparatus may be included comprising a vacuum distillation means whereby impure water is converted into distilled water, preferably by utilizing the heat generated in said power source.

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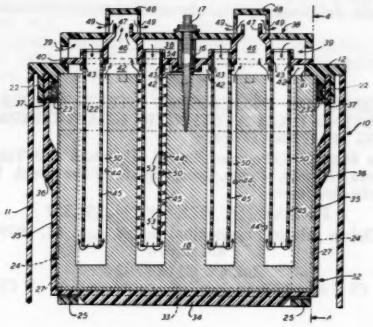
**3,788,900**
**AIR-DEPOLARIZED PRIMARY BATTERY**
**Jacob E. Schmidt, Little Falls, N.J., assignor to McGraw-Edison Company, Elgin, Ill.**
**Filed July 17, 1972, Ser. No. 272,299**
**Int. Cl. H01m *27/00***
**U.S. Cl. 136—86 A** **4 Claims**

An air-depolarized battery of the zinc-anode, carbon-cathode and alkaline electrolyte type has a series of cavities leading from the top face of the carbon cathode to nearly the bottom thereof and a chimney system which produces a rapid transfer of oxygen from the outside atmosphere to the gas-electrolyte interface of the cathode resulting in a marked increase in current capacity of the



battery. As a further feature, which may be employed independently or in combination with the chimney system above mentioned, wire coils are inserted in the cavities to obtain a low resistance connection of the cathode terminal to the lower active portions of the cathode whereby a still greater efficiency and current capacity is achieved.

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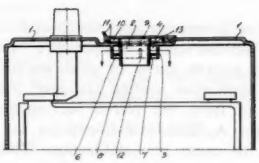
**3,788,901**
**STORAGE BATTERIES**
**Rolf Filip Gunnar Thornblad, Hultsfred, Sweden, assignor to Globelite Batteries Canada Limited, Scarborough, Ontario, Canada**
**Filed Feb. 22, 1972, Ser. No. 228,256**
**Int. Cl. H01m *1/02***
**U.S. Cl. 136—170** **5 Claims**



In storage batteries of the lead-acid type which are especially used for vehicles such as automobiles and motor boats, a dual vent for each cell is provided so that gases may escape from the cells without carrying electrolyte along with them. The dual vent has two valves arranged to return electrolyte to the cell from which it has splashed, and they are situated so that gas escapes from the higher vent and relieves gas pressure from the lower vent to permit flow of electrolyte back to the cell.

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**3,788,902**
**PROCESS FOR IMPROVING THE ELONGATION OF GRAIN REFINED COPPER BASE ALLOYS**
**Eugene Shapiro, Hamden, Jacob Crane, Woodbridge, and George H. Eichelman, Jr., Cheshire, Conn., assignors to Olin Corporation, New Haven, Conn.**
**No Drawing. Filed Nov. 24, 1972, Ser. No. 309,345**
**Int. Cl. C22f *1/08***
**U.S. Cl. 148—11.5 R** **15 Claims**

A process for improving the elongation of copper base alloys by controlled grain coarsening. Copper base alloys

containing from about 2 to about 9.5% aluminum, less than 1% zinc, and a grain refining element such as iron, chromium, zirconium, or cobalt are subjected to a final cold reduction of from about 8% to about 22% and a final anneal of from about 550 to about 715° C. Alternatively, the alloy can be subjected to a sequence of decreasing reductions interspersed with high temperature anneals, followed by the above final reduction and anneal.

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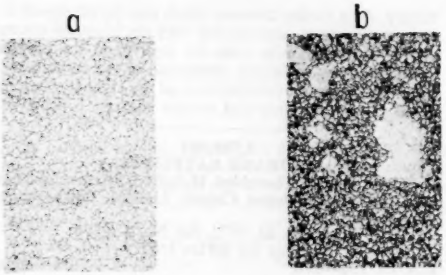
3,788,903

## METHOD OF PROCESSING STEEL MATERIAL HAVING HIGH AUSTENITIC GRAIN-COARSENING TEMPERATURE

Akira Suzuki, Kobe, and Shushi Kinoshita and Takeshi Ueda, Akashi, Japan, assignors to Kobe Steel, Ltd., Kobe-shi, Japan

Filed Apr. 15, 1971, Ser. No. 134,332
Claims priority, application Japan, Apr. 15, 1970, 45/32,078
Int. Cl. C21d 7/02
U.S. Cl. 148—12.1 7 Claims




A method of processing steel material having a high austenitic grain-coarsening temperature and an abnormal grain growth curve of cold worked austenitic grain, which comprises heating said steel material at a temperature of from the ferrite recrystallization temperature to the $A_3$ transformation point for more than five minutes to cause recrystallization. This technique prevents the formation of mixed grains upon austenitizing and thereby preserves the mechanical properties of the steel material.

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3,788,904

## METHOD OF PRODUCING AN INTEGRATED SOLID STATE CIRCUIT

Tegze Haraszti, Heilbronn, and Rainer Grosholz, Heilbronn-Bockington, Germany, assignors to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt am Main, Germany

Filed Feb. 18, 1971, Ser. No. 116,494
Claims priority, application Germany, Feb. 19, 1970, P 20 07 627.1
Int. Cl. H01l 7/44
U.S. Cl. 148—186 7 Claims

A method of producing an integrated solid state circuit containing a MOS field effect transistor and a diode including introducing into a semiconductor body of a first type of conductivity, a diode region of a second type of conductivity, introducing source and drain regions of the second type of conductivity into the semiconductor body with at least one of the source or drain regions projecting into the diode region and finally completing the diode.

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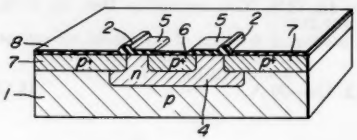
3,788,905

## SEMICONDUCTOR DEVICE AND METHOD OF PRODUCING THE SAME

Masayuki Yamamoto, Kodaira, Kazuo Kobayashi, Tokyo, and Youitu Ohashi, Kodaira, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Original application Oct. 20, 1967, Ser. No. 676,832. Divided and this application Nov. 28, 1969, Ser. No. 879,951
Claims priority, application Japan, Oct. 21, 1966, 41/68,886
Int. Cl. H01l 7/44
U.S. Cl. 148—187 3 Claims




A junction-type field effect transistor having a source region, a drain region and a carrier path region of n-type formed by diffusing an impurity from one principal surface of a p-type silicon substrate, a p-type gate region diffused between the source region and the drain region so as to define the carrier path region, and a high-doped $p^+$-type layer formed in the p-type silicon substrate surface directly beneath the silicon oxide film in order to eliminate the undesirable influence exerted by an inverted layer induced in the substrate surface by the oxide film. The high-doped $p^+$-type layer is continuous with the p-type gate region and is formed simultaneously with the gate region by a single diffusion treatment.

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3,788,906

## SOLID PROPELLANT COMPOSITIONS CONTAINING LITHIUM PASSIVATED BY A COATING OF POLYETHYLENE

Herbert H. Schroeder, Edina, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

No Drawing. Filed Dec. 28, 1961, Ser. No. 164,214
Int. Cl. C06d 5/06
U.S. Cl. 149—6 11 Claims

1. A solid unitary composite propellant grain comprising, in admixture:

(1) passivated lithium metal which increases in weight no more than 10 percent from the dry state over 12 hours in contact with an environment of 50 percent relative humidity and 25° C., said passivation being accomplished by a coating on lithium which is chemically inert toward and insoluble in the constituents of the grain,

(2) a low-volatility fluorine oxidizing agent

(a) containing more than about 50 percent by weight of fluorine which is bonded to carbon and nitrogen atoms and

(b) having a heat of reaction with lithium of not less than about 100 kilocalories per gram equivalent of the fluorine therein, and

(3) a solid polymeric binder
  (a) which has a molecular weight of not less than about 10,000
  (b) which contains no active hydrogen and
  (c) in which at least about 50 percent of the atoms in the backbone are carbon atoms,

the overall weight ratio of lithium to fluorine in the propellant grain being not less than about 7:19.

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**3,788,907**

## TRACER INCENDIARY MATERIALS INCLUDING LIQUID ALKYLALUMINUM AND COMPATIBLE INORGANIC OXIDIZER

**U. Albert Lehikoinen, Detroit, Mich., assignor to Ethyl Corporation, Richmond, Va.**

**No Drawing. Filed Sept. 7, 1972, Ser. No. 287,068**
**Int. Cl. C06d *1/10***
**U.S. Cl. 149—22** **19 Claims**

An alkylaluminum-based material suitable for tracer applications having a lower alkylaluminum compound such as triethylaluminum or mixtures thereof, an inorganic oxidizer, and optionally a finely divided metal or metal hydride.

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**3,788,908**

## TRACER INCENDIARY COMPOSITION OF ALKYLALUMINUM, INORGANIC OXIDIZER, AND ZIRCONIUM

**U. Albert Lehikoinen, Detroit, Mich., and Gerald Franklin, Philadelphia, Pa., assignors to Ethyl Corporation, Richmond, Va.**

**No Drawing. Filed Sept. 7, 1972, Ser. No. 287,067**
**Int. Cl. C06b *11/00***
**U.S. Cl. 149—42** **8 Claims**

An alkylaluminum-based material suitable for tracer applications having a lower alkylaluminum compound such as triethylaluminum or mixtures thereof, an inorganic oxidizer, and optionally a finely divided metal or metal hydride.

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**3,788,909**

## AQUEOUS BLASTING COMPOSITIONS CONTAINING AN IMMISCIBLE LIQUID HYDROCARBON FUEL AND METHOD OF MAKING SAME

**Lex Lynn Udy, Salt Lake City, and Harvey Allred Jessop and Daniel Aaron Wasson, Murray, Utah, assignors to Ireco Chemicals, Salt Lake City, Utah**

**No Drawing. Filed Nov. 24, 1972, Ser. No. 309,178**
**Int. Cl. C06b *1/04***
**U.S. Cl. 149—60** **19 Claims**

Aqueous blasting agents containing an immiscible liquid hydrocarbon fuel are formulated by prethickening the liquid phase of the composition by the addition of a thickening agent, preferably a biopolymer gum, thereafter adding the liquid fuel and subsequently mixing the combination so as to form a stable, fine dispersion of immiscible liquid hydrocarbon fuel droplets throughout the liquid phase.

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**3,788,910**

## EXTRACTION AND PURIFICATION OF MALTOTRIOSE AND MALTOTETROSE

**Graham G. Stewart and Allan E. Earl, London, Ontario, Canada, assignors to Labatt Breweries of Canada Limited, London, Ontario, Canada**

**No Drawing. Filed Jan. 17, 1972, Ser. No. 218,478**
**Int. Cl. C12b *1/00***
**U.S. Cl. 195—11** **6 Claims**

Maltotriose and maltotetrose are extracted from a fermentable source material, conveniently a brewer's wort, and purified in a commercially advantageous manner by fermenting the material with *Saccharomyces uvarum* to remove lower molecular weight sugars, separating the yeast from the remaining liquid and subjecting the liquid containing maltotriose and maltotetrose to gel filtration chromatography and collecting samples containing maltotriose and/or maltotetrose. The collected fractions containing the desired maltotriose and/or maltotetrose can be subjected to further purification by means of charcoal column chromatography.

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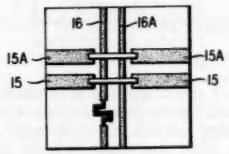
**3,788,911**

## MANUFACTURE AND TESTING OF THIN FILM CIRCUITRY

**Burton Abram Unger, Berkeley Heights, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Continuation-in-part of application Ser. No. 99,998, Dec. 21, 1970, now Patent No. 3,740,819. This application Dec. 3, 1971, Ser. No. 204,646**
**Int. Cl. H01l *7/00***
**U.S. Cl. 156—3** **3 Claims**




The procedure of testing the crossover points for short circuits, in thin film circuitry containing large numbers of air isolated crossovers, is simplified by providing temporary thin film interconnections to combine discrete conductive paths into a smaller number of paths none of which contains a crossover bridge and a crossunder conductor from the same crossover point, so that many crossovers can be tested simultaneously. The interconnection may be accomplished by providing that portions of a titanium layer, used as a means for bonding the circuitry to the substrate, are also established at the areas required for the interconnection. The temporary interconnection is removed, as by etching, after the testing is performed.

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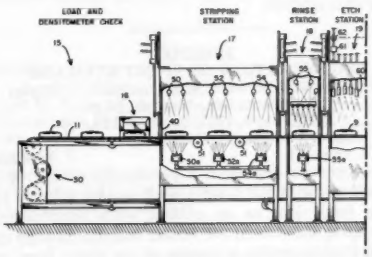
**3,788,912**

## SYSTEM SUITABLE FOR CONTROLLING ETCHING WITHOUT THE AID OF AN ETCHANT RESISTANT

**John J. Frantzen, North St. Paul, and Charles M. Lund, Stillwater, Minn., assignors to Buckbee-Mears Company, St. Paul, Minn.**

**Original application July 14, 1969, Ser. No. 841,317. Divided and this application Nov. 10, 1971, Ser. No. 197,536**
**Int. Cl. C23f *1/02***
**U.S. Cl. 156—6** **10 Claims**




An etching system having sets of prearranged nozzles for dispensing etchant onto preformed masks in a predetermined pattern to allow an operator to controllably enlarge the apertures in a preformed mask without the aid of an etchant resist.

3,788,913

## SILICON NITRIDE ON SILICON OXIDE COATINGS FOR SEMICONDUCTOR DEVICES

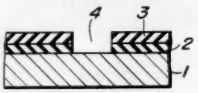
Minoru Ono, Kodaira, and Toshimitu Momoi, Tokyo, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Original application Jan. 31, 1968, Ser. No. 701,988, now abandoned. Divided and this application Aug. 20, 1970, Ser. No. 65,383

Claims priority, application Japan, Feb. 3, 1967, 42/6,608, 42/6,609

Int. Cl. H01l 7/50

U.S. Cl. 156—11 5 Claims




A method of manufacturing a semiconductor device wherein a silicon nitride film covers the exposed surfaces of an oxide film and the exposed major surface of a semiconductor body, and wherein holes are formed by chemical etching only in the portion of said silicon nitride film directly contacting said major surface, thereby obtaining precise etching of the insulating covering.

3,788,914

## CHEMICAL MILLING OF TITANIUM, REFRACTORY METALS AND THEIR ALLOYS

John Gumbelevicius, St. Louis County, Mo., assignor to McDonnell Douglas Corporation, St. Louis, Mo.

No Drawing. Continuation-in-part of abandoned application Ser. No. 661,753, Aug. 3, 1967. This application Nov. 18, 1971, Ser. No. 200,143

Int. Cl. C23f 1/00

U.S. Cl. 156—18 10 Claims

A process of chemically milling titanium, refractory metals, and their alloys, resulting in decreased absorption of hydrogen, thus allowing chemical milling of beta titanium and alpha beta titanium, which normally cannot be chemically milled in conventional chemical milling solutions because of hydrogen embrittlement. Another advantage of this process is a better chemically milled surface finish and more rapid and uniform metal removal rates than obtainable in conventional refractory metal chemical milling solutions. The process also is suitable for alpha titanium alloys. The chemical milling solution itself consists of a mixture of nitric acid, hydrofluoric acid or fluoride salts, and derivatives of carbonic acid such as carbamide, in concentrations of at least 10 grams per liter of final solution.

3,788,915

## REGENERATION OF SPENT ETCHANT

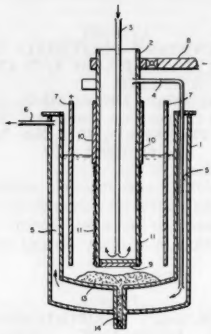
Michael Gulla, Newton, Mass., assignor to Shipley Company, Inc., Newton, Mass.

Filed Feb. 9, 1972, Ser. No. 224,894

Int. Cl. C22d 1/00

U.S. Cl. 156—19 21 Claims

This invention relates to a process for extracting dissolved metal as metal from a used etchant solution containing ferric ions as an oxidant while simultaneously regenerating the etchant for further use. The process comprising electrowinning a portion of the metal from solution under conditions effective for electrowinning, but not etching. These conditions include a substantial freedom from oxygen in the vicinity of the cathode, substantial freedom from solution agitation during the winning operation and preferably, for good cathode efficiency, relatively low solution temperature at the interface of the solution and the cathode, typically below 120° F. The process is economical because the ferric ion reduced to ferrous ion during the etching operation is oxidized back to the ferric form at the anode during the electrowinning process. Thus, the etchant is regenerated and suitable for re-use. Moreover, only a portion of the dissolved metal is removed from solution, the remainder being left in solution. The process is an important contribution to pollution abatement efforts as it eliminates the need for dumping spent etchant and dissolved metal wastes resulting from an etching operation.



3,788,916

## METHOD AND APPARATUS FOR MANUFACTURING REINFORCED PLASTIC CYLINDERS

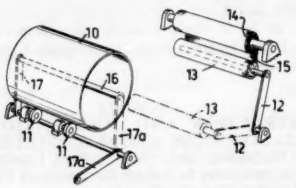
Gustaf Shiro Gadelius, Lidingo, Sweden, assignor to Gadelius Inter S.A., Geneva, Switzerland

Original application Mar. 2, 1970, Ser. No. 15,783, now abandoned. Divided and this application Jan. 3, 1972, Ser. No. 215,224

Claims priority, application Sweden, Mar. 3, 1969, 2,887/69; Mar. 17, 1969, 3,642/69; Nov. 14, 1969, 15,665/69

Int. Cl. B32b 31/20; B29d 23/00

U.S. Cl. 156—74 2 Claims

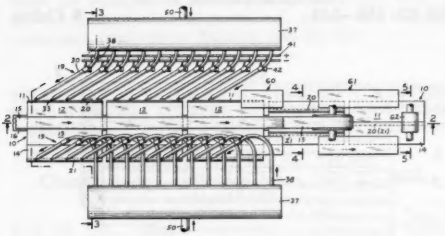



A method of manufacturing glass-fibre reinforced plastic cylinders comprising the steps of applying a liquid plastic composition to the inside of a rotary moulding cylinder to disperse the plastic evenly over the interior surface of the cylinder by the action of centrifugal force, and introducing reinforcing material into the cylinder to form a uniform layer on the plastic layer, the reinforcing material being pressed into the plastic layer by centrifugal force and by means of a roller.

## 3,788,917
## METHOD FOR HOT GAS ACTIVATION OF THERMOPLASTIC SEALING SURFACES

**Frank Raymond Linda, Bridgeport, Conn., assignor to International Paper Company, New York, N.Y.**

**Filed July 17, 1970, Ser. No. 55,746**
**Int. Cl. B29c *25/00***
**U.S. Cl. 156—82** **31 Claims**



Continuously advancing thermoplastic surfaces which are to be sealed together are contacted with a stream of a hot inert gas which impinges upon the surfaces in a direction opposed to that in which the surfaces are advancing and at an angle of from about 10 to 40° measured from the plane of the advancing surfaces. The gas treated surfaces are then brought into contact under pressure to effectuate a seal between the surfaces. The stream of hot gas preferably has the configuration of a thin flat ribbon with the long dimension of the cross section of the ribbon being substantially parallel to the plane of the thermoplastic surface so as to create an "air knife" which effectively removes the boundary layer from the thermoplastic surface.

An apparatus is provided for carrying out the above described process which comprises means for advancing the surfaces continuously, nozzle means disposed to impinge against the advancing surfaces a stream of hot gas in the manner called for above, means for supplying gas to the nozzle, means for heating the gas supplied to the nozzle, and means for bringing the gas treated surfaces into contact under pressure to effectuate sealing of the surfaces.

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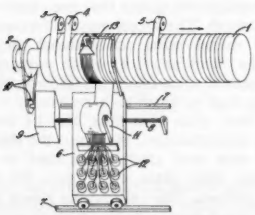
## 3,788,918
## METHOD FOR THE CONTINUOUS PRODUCTION OF FIBER REINFORCED PLASTIC PIPES OF VARIABLE WALL THICKNESS

**Peder Ulrik Poulsen, Esbonderup 3240, Esrum, Denmark**

**Filed Jan. 12, 1972, Ser. No. 217,115**
**Claims priority, application Denmark, Dec. 15, 1970, 6,356/70**
**Int. Cl. B31c *3/00***
**U.S. Cl. 156—171** **15 Claims**



Method for producing a shell of nonuniform thickness wherein hardenable shell forming materials are fed onto an envelope which is both rotated about a longitudinal axis and simultaneously advanced along the axis at a generally constant rate. The materials are fed onto the envelope from applicator means at a generally uniform and preferably uninterrupted rate. Nonuniform shell thickness is obtained, however, by moving the applicator means in one of the directions of envelope movement for a portion of a programmed cycle to give a thick shell section and returning the applicator means in the opposite direction of envelope movement to the starting point of the applicator means during another portion of the cycle to give a thinner shell section. The movement of the applicator means may be longitudinally of the envelope, or may be circumferentially of the envelope.

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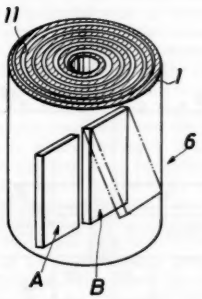
## 3,788,919
## METHOD OF MANUFACTURING ARTIFICIAL LOGS

**Rinnosuke Susuki, Tokyo, Hiroshi Hoshi, Narashino, and Kaoru Umeya, Sendai, Japan, assignors to Lion Fat and Oil Co., Ltd., Tokyo, Japan**

**Filed Aug. 13, 1971, Ser. No. 171,593**
**Claims priority, application Japan, Aug. 17, 1970, 45/71,937, 45/71,938; Oct. 1, 1970, 45/86,471; Oct. 6, 1970, 45/87,774, 45/87,775; Oct. 1, 1970 (utility model), 45/97,981**
**Int. Cl. B31c *13/00***
**U.S. Cl. 156—184** **16 Claims**




A synthetic resin sheet, either foamed or non-foamed, of a synthetic resin material containing a filler is laminated by winding it into the form of a roll to thereby form an artificial log. The artificial log thus produced has a grain structure closely simulating that of natural lumber.

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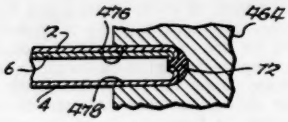
## 3,788,920
## METHOD OF MAKING ROLLED EDGE SEALED CORRUGATED PAPERBOARD

**Robert H. Frappier, Agawam, Mass., Hal W. Tanner, Jr., Georgetown, S.C., and William O. Wagers, Massillon, Ohio, assignors to International Paper Company, New York, N.Y.**

**Original application Aug. 21, 1969, Ser. No. 852,038, now Patent No. 3,624,236. Divided and this application July 15, 1971, Ser. No. 162,865**
**Int. Cl. B31f *1/00*; B32b *3/04, 31/18***
**U.S. Cl. 156—202** **2 Claims**

A method for making corrugated core paperboard in which the edges of the facing sheets are rolled inwardly toward each other and tucked into the end of the corrugated core convolutions to form an enclosure therefor; including feeding of the board along a path, slitting the end of the core by cutting or crushing the core along a line intermediate the facing sheets and rolling and tucking the end edges of the facing sheets into the slit,

the apparatus including driven belts between which the board is fed along a path, a knife support along the edge of the path through which the edge of the board




is fed and dies having edge engaging surfaces for rolling and tucking the ends of the facing sheets into the core.

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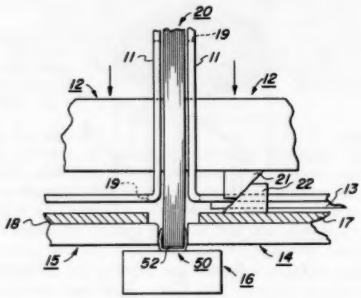
**3,788,921**

## APPARATUS AND METHOD FOR BINDING A STACK OF SHEETS

**Neil A. Polit, Cary, Donald R. Snowden, Chicago, and Donald W. Watson, Arlington Heights, Ill., assignors to Xerox Corporation, Stamford, Conn.**

**Filed Dec. 6, 1971, Ser. No. 204,986**
**Int. Cl. B32b** *3/04*
**U.S. Cl. 156—216** **21 Claims**



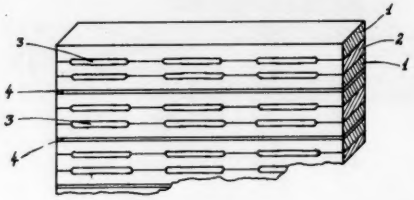

Method and apparatus for binding a stack of sheets whereby a binding member including a substrate material having at least one strip of heat activated adhesive is employed to form the desired book-like assembly. The binding member includes a low tack adhesive material extending longitudinally along the central portion of the substrate material and a high tack material extending longitudinally adjacent the low tack material and on either side thereof on the substrate material. The stack of sheets is transported into engagement with the binding member, the member being thus deformed so the low tack adhesive material is in contact with one edge of the sheets of the stack and the high tack adhesive material is in contact with the other sheets of the stack. Heat is applied to the adhesive to cause the high tack material and low tack material to adhere to the portions of the stack in contact therewith. Pressure is applied to the side portions of the deformed substrate material so the high tack material is firmly pressed into contact with the outer sheets of the stack. Pressure is also applied to the portion of the substrate material in contact with the one edge of the sheets. A bond is thus formed between the substrate material and the stack of sheets to provide a book-like assembly.

**3,788,922**

## METHOD OF MANUFACTURING A LAMINATED FIBRO-FILAMENTARY OR FILM STRUCTURE WHICH IS PARTLY DELAMINATED

**Ole-Bendt Rasmussen, 7 Topstykket, DK–3460 Birkerod, Denmark**

**Filed July 21, 1971, Ser. No. 164,745**
**Claims priority, application Great Britain, July 21, 1970, 35,333/70**
**Int. Cl. B32b** *7/04, 31/00*
**U.S. Cl. 156—244** **9 Claims**




Method of producing fibrous or sheet structure comprising melt coextruding a laminated structure comprising an assembly of two or more layers from polymeric material laminated together in intimate adherence with one another and simultaneously or subsequently so treating the assembly as to produce a regular pattern of areas of strong bonding separated by areas of weak or no bonding between the layers of the assembly.

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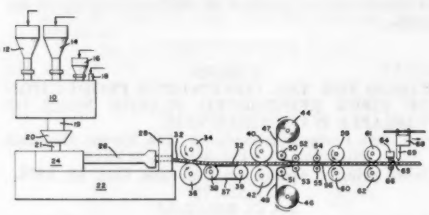
**3,788,923**

## SILICA-FILLED, HIGH MOLECULAR WEIGHT POLYOLEFIN

**Frank Yassin Soliman, Morristown, N.J., assignor to Allied Chemical Corporation, New York, N.Y.**

**Filed Aug. 24, 1971, Ser. No. 174,446**
**Int. Cl. B29c** *19/00;* **B32b** *31/00*
**U.S. Cl. 156—244** **17 Claims**



This invention relates to the production of low cost, reinforced thermoplastic sheets that are characterized by rigidity and strength. The sheets may be formed into various structural shapes using conventional metal-forming techniques. The sheet product, which comprises as the major constituent a silica-filled, medium or high density polyolefin with high or extra-high molecular weight, e.g., polyethylene, with silica as a filler may be used without any additional reinforcement. However, the sheet can also be laminated with steel cloth, sheet steel or steel foil, fiber glass mat, fiber glass cloth, etc., for additional strength and stiffness. The reinforcing sheets are assembled with the filled thermoplastic sheet at a temperature above the softening point of the thermoplastic such that the assembly remains intact after the processing pressure is eliminated. The thermoplastic sheet product exhibits

improved load bearing characteristic with lower elongation in comparison to the unfilled polymeric material alone. The impact characteristics of the filled system is higher than other filled plastic sheets. The corrosion resistance, ease of cleanability, the negligible amount of water absorption, and the high mechanical properties of the plastic sheets, especially at sub-zero temperature environment, promote their use in several structural applications; for example, in forming structural shapes such as for the transportation of goods, e.g., pallets, for shipping containers, truck-trailer flooring, and the like.

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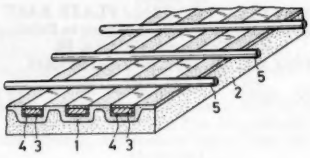
**3,788,924**

**METHOD FOR PRODUCING MAGNETIC KEEPERS**

**Seihin Kobayashi, Michihiro Torii, and Masanao Okuda, Shizuoka-ken, Japan, assignors to Fuji Electrochemical Co., Ltd., Tokyo, Japan**

**Filed Dec. 21, 1971, Ser. No. 210,379**
**Claims priority, application Japan, Dec. 23, 1970, 45/118,000**
**Int. Cl. B32b** *5/12, 31/20*
**U.S. Cl. 156—249** **4 Claims**




A flexible ferrite sheet containing fine ferromagnetic ferrite powders cohesively bonded together by a plastic binder and a flexible sheet containing fine powders of non-magnetic substance cohesively bonded together by a plastic binder are laminated and subjected to pressure to form a monolithic composite sheet. A plurality of parallel driving wires are embedded into the ferromagnetic ferrite sheet side of the monolithic composite sheet to effect plastic deformation of the non-magnetic sheet portion along with deformation of the ferrite sheet portion.

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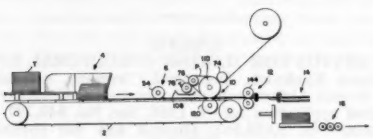
**3,788,925**

**METHOD FOR MAKING TILE PRODUCTS**

**Frank L. Califano, Hackensack, N.J., and Joseph Laszlo, New York, N.Y., assignors to The Flintkote Company, New York, N.Y.**

**Application June 16, 1969, Ser. No. 840,587, now Patent No. 3,607,590, dated Sept. 21, 1971, which is a division of application Ser. No. 528,569, Feb. 8, 1966, now Patent No. 3,583,889. Divided and this application July 16, 1970, Ser. No. 62,764**
**Int. Cl. B32b** *31/00*
**U.S. Cl. 156—269** **4 Claims**



A method for preparing an adhesive coated tile product with a protective sheet thereon which sheet is removed when the tile products are installed. The uncoated tile products are moved from a stack in succession by a conveyor at a constant speed and in uniformly spaced relationship and an adhesive coated web having an adhesive patch with an area less than the area of the tile product is applied over the moving tile products and bonded thereto. This web is then severed between each adjacent tile product by a cutting knife in such a manner as to provide an overlap of the web and the resultant adhesive bonded to the tile is set back from the tile edges.

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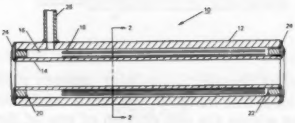
**3,788,926**

**METHOD OF MANUFACTURING BORON-ALUMINUM COMPOSITE TUBES**

**Martin Donald Weisinger, San Diego, Calif., assignor to General Dynamics Corporation, San Diego, Calif.**

**Filed Apr. 3, 1972, Ser. No. 240,711**
**Int. Cl. B29c** *17/07*
**U.S. Cl. 156—286** **11 Claims**



A method of forming high strength tubes from composites comprising boron fibers in an aluminum matrix is disclosed. A first metal tube having an internal diameter substantially equal to the desired composite tube external diameter is provided with an evacuation fitting. Sheets in which boron fibers are unidirectionally bonded to aluminum are wrapped around a second, narrower, metal tube with the fibers parallel to the tube axis. The wrapped second tube is inserted into the first tube and the inter-tube space is sealed at each end, as by welding. The inter-tube space is evacuated and the fitting sealed. The second tube is selected to have substantially less wall strength than the first tube. Preferably, this is accomplished by using tubes formed from the same material, but with the first tube having a wall thickness at least twice that of the second tube. The assembly is then placed in an autoclave and heated to a temperature of from about 800 to 1000° F. under a pressure of from about 3000 to 10,000 p.s.i. This causes the second (inner) tube to expand, pressing the composite layer against the inner wall of the outer tube, while diffusion bonding the wrapped composite into a single unitary tube. The assembly is cooled and the first and second tubes are removed, such as by chemical etching. A highly uniform high strength seamless composite tube results.

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**3,788,927**

**METHOD OF MAKING A REINFORCED LAMINATE IN COMBINATION WITH A CORE MATERIAL**

**Peter L. Jurisich, 4731 Royce Road, Irvine, Calif. 92804**

**No Drawing. Application Dec. 1, 1969, Ser. No. 881,318, which is a division of application Ser. No. 745,381, July 17, 1968, both now abandoned. Divided and this application Aug. 17, 1971, Ser. No. 172,547**
**Int. Cl. B32b** *31/00, 3/12, 17/04*
**U.S. Cl. 156—290** **5 Claims**

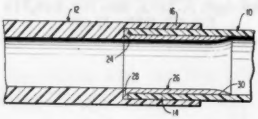
A reinforced structure and method in which a body consisting of fibers which are woven or unwoven, which fibers have spaces between them, has a cured resin coating the fibers but not filling the spaces between them, and in which an uncured resin is applied to the body. This uncured resin may be impregnated into the body to fill the spaces between the fibers or the uncured resin may be applied to a surface of the body, the resin being of such a character that upon heating it will flow into and fill the spaces.

3,788,928

## METHOD OF FORMING A LAP JOINT BETWEEN TUBULAR ARTICLES OF THERMOPLASTIC MATERIAL

Eugene H. Wise, Newhall, Calif., assignor to R & G Sloane Manufacturing Company, Inc., Los Angeles, Calif.

Filed Mar. 26, 1971, Ser. No. 128,394
Int. Cl. B29c *19/00*; C09j *5/00*
U.S. Cl. 156—294 4 Claims



A method of forming a lap joint between tubular articles of thermoplastic material, wherein a reinforcing sleeve is positioned within the end portion of one of the articles that is to be disposed within a complementary end portion of the other of the articles, the reinforcing sleeve being formed of a material that has a melting point that is higher than that of the thermoplastic material of each of the articles. Thereafter, the end portions of the articles are heated, either before or after they are overlapped to form the lap joint, to melt the outer surface of the end portion of the one article and the inner surface of the end portion of the other article, thereby effecting the fusion welding of the end portions of the articles. The reinforcing sleeve serves to prevent the end portion of the one article from deforming when it is heated and inserted into the other article, or when it is heated while disposed within the end portion of the other article.

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3,788,929

## METHOD FOR PLASTICIZING WOOD

Jouko Huttunen, Porvoo, Finland, assignor to Neste Oy, Helsinki, Finland

No Drawing. Filed June 8, 1970, Ser. No. 44,636
Claims priority, application Finland, June 10, 1969, 1,713/69
Int. Cl. B27h *1/00*; C09j *5/02*
U.S. Cl. 156—307 2 Claims

Wood is treated by being initially impregnated with hydrazine. Thereupon wood is shaped in the usual manner and then excess hydrazine is removed. Hydrazine is preferably used in an aqueous solution. Wood may be heated after the impregnation. The process is suitable for treating wood veneers and various wood boards.

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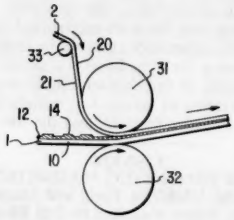
3,788,930

## METHOD OF FIXING IMAGES OBTAINED BY LIQUID DEVELOPMENT IN ELECTROPHOTOGRAPHY

Satoru Honjo and Osamu Fukushima, Asaka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Oct. 29, 1971, Ser. No. 193,957
Claims priority, application Japan, Oct. 30, 1970, 45/96,147
Int. Cl. C09j *5/00*
U.S. Cl. 156—307 4 Claims

A method of permanently fixing a toner image on an electrophotographic sensitive material, said toner image being formed by developing an electrostatic latent image provided on the photoconductive coating of said material with a liquid developer comprising a charged toner dispersed in a volatile insulating carrier liquid, comprising laminating a transparent plastic film by means of an adhesive layer provided on said film on said toner-image bearing surface by heat and/or pressure while said material is wet with the volatile liquid used in the treatment of said material to assist the lamination of said film onto said toner-image bearing surface.



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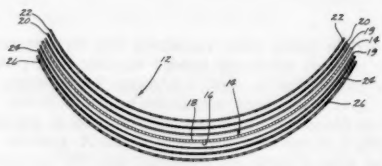
3,788,931

## LAMINATED PRINTING PLATE BASE

James A. Hynes, Winnetka, Ill., assignor to Printing Plate Supply Company, Chicago, Ill.

Filed May 30, 1972, Ser. No. 257,916
Int. Cl. C09j *5/00*, *7/00*
U.S. Cl. 156—309 12 Claims



The method of making a laminated printing plate base is disclosed and generally comprises the steps of taking a metal layer and coating the opposite surfaces thereof with a thermo-adhesive; heating the metal layer and adhesive to a predetermined temperature; taking a first layer of thermoplastic material and placing a layer of scrim cloth adjacent one of the surfaces thereof; taking a second layer of thermo-plastic material and placing a second layer of scrim cloth adjacent one of the surfaces thereof; heating the first and second layers of thermo-plastic material to a predetermined temperature; placing the heated layers of thermo-plastic material on opposite sides of the heated metal layer; and subjecting the components to a predetermined temperature and pressure to activate the thermo-adhesive and to laminate the components into a single unitary structure.

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3,788,932

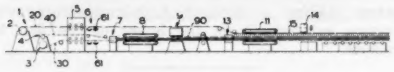
## APPARATUS FOR MAKING STRUCTURAL UNITS

Reinhard Klinkosch, Dortmund, Germany, assignor to Hoesch Aktiengesellschaft, Dortmund, Germany

Original application July 9, 1969, Ser. No. 840,397, now Patent No. 3,650,863. Divided and this application Sept. 8, 1971, Ser. No. 178,657
Claims priority, application Germany, July 17, 1968, P 17 79 192.3
Int. Cl. B32b *31/08*
U.S. Cl. 156—499 5 Claims

An apparatus for making structural units. This apparatus includes web supply means for supplying three discrete elongated strip-shaped webs, first advancing means for advancing the webs in a predetermined path

and first means for applying to one of the webs a first foamable synthetic plastic material and foaming the same to form a first layer. Furthermore, the apparatus includes first guide means for guiding another strip-shaped web onto said first layer and second advancing means for advancing the webs and the layer and also second means for



applying an intermediate layer onto a web. Finally, the apparatus also includes second guide means for guiding the final web along the aforesaid path and third means for introducing the second foamable synthetic plastic material and foaming the same so as to produce an elongated laminar strip unit.

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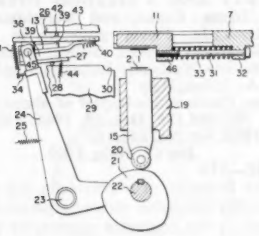
**3,788,933**

**APPPARATUS FOR HEAT SEALING THE OVERLAPPING END PORTIONS OF AN ELONGATED THERMOPLASTIC STRAPPING BAND**

**Seinosuke Nakazawa, Kenagawa, Japan, assignor to Ikegai Tekko Kabushiki Kaisha, Tokyo, Japan**

**Filed Sept. 23, 1971, Ser. No. 183,022**
**Claims priority, application Japan, Sept. 28, 1970, 45/84,881**
**Int. Cl. B32b** *31/18, 31/20;* **B29c** *27/00*
**U.S. Cl. 156—513** **4 Claims**



A welding apparatus applicable to a packing machine for use in strapping packages with a thermoplastic band, which comprises a movable heat plate provided with plural blades disposed parallel to the direction of strain of the band, which plate is moved against the overlapped portion of the plastic bands to be welded, thereby melting said plastic bands by the portion surrounding said blades as they penetrate one of the overlapping bands and eat into the other one, and means for pressing the overlapped portions thus partially melted together to thereby join said bands.

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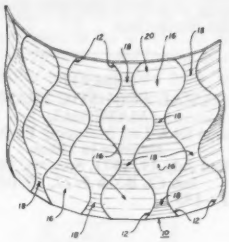
**3,788,934**

**THREE-DIMENSIONAL FOLDED STRUCTURE WITH CURVED SURFACES**

**Anthony P. Coppa, 748 S. Highland Ave., Merion, Pa. 19066**

**Filed Oct. 1, 1971, Ser. No. 185,640**
**Int. Cl. A63g** *31/00;* **A63h** *33/16;* **B32b** *3/30*
**U.S. Cl. 161—17** **11 Claims**

A three-dimensional fold structure is formable in a polygonal cross-section from a sheet having a plurality of curved hinge lines which are undulating and non-crossing. The axes of the undulating hinge lines have a substantial component along the axis of the structure, and adjacent hinge lines undulate in opposite directions.



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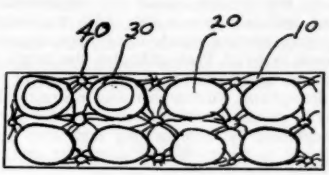
**3,788,935**

**HIGH SHEAR-STRENGTH FIBER-REINFORCED COMPOSITE BODY**

**James J. Shyne, Caldwell, and John V. Milewski, Saddle Brook, N.J., assignors to General Technologies Corporation, Reston, Va.**

**Continuation of application Ser. No. 597,686, Nov. 29, 1966. This application May 27, 1970, Ser. No. 41,710**
**Int. Cl. B32b** *15/00*
**U.S. Cl. 161—141** **10 Claims**




A high shear-strength composite is formed in a matrix material by aligning boron filaments of larger diameter, for example ten to one hundred microns, and supporting them with smaller intersititally disposed whiskers of alpha-alumina randomly distributed in the body of a diameter, for example of one to three microns, which fibers may be discontinuous.

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**3,788,936**

**NONWOVEN LAMINATE CONTAINING BONDED CONTINUOUS FILAMENT WEB**

**Robert James Brock, Appleton, and Paul Bernard Hansen and John C. Wilson, Neenah, Wis., assignors to Kimberly-Clark Corporation, Neenah, Wis.**

**Continuation-in-part of abandoned application Ser. No. 14,943, Feb. 27, 1970. This application Sept. 1, 1971, Ser. No. 177,078**
**Int. Cl. B32b** *7/14*
**U.S. Cl. 161—148** **17 Claims**

Laminates comprising a cellulosic web and a web of continuous thermoplastic filaments are disclosed. The continuous filament web is bonded by means of an intermittent pattern of spot bonds which are characterized by their

ability to release bonded filaments at levels of strain approaching but less than the breaking strength of the filaments. The disclosed laminates are strong, attractive in appearance, can absorb and retain fluid, and possess desirable energy absorption characteristics, especially over small laminate elongations.

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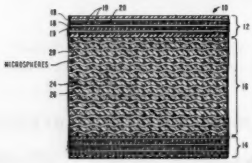
**3,788,937**
**STRUCTURAL ACOUSTIC TRANSMISSION MATERIAL**
**George Dick Lee, Monterey Park, Calif., assignor to Hitco**
**Filed July 19, 1971, Ser. No. 163,788**
**Int. Cl. B32b** *5/22, 19/02*
**U.S. Cl. 161—158** **10 Claims**




A structural material having excellent acoustic transmission properties comprises a partially elastomeric, low density panel of composite construction. In one example a number of layers of a lightweight synthetic fabric define a transmission panel of appreciable thickness and include approximately 50% by weight of a resin matrix mixture which is of approximately 50% elastomeric material. Preferably also, the matrix material incorporates approximately 10% by weight of thin wall glass microspheres. Further increases in structural properties may be obtained, without undue sacrifice of transmission properties, by incorporating thin inner and outer shells joined to the multi-layer composite core.

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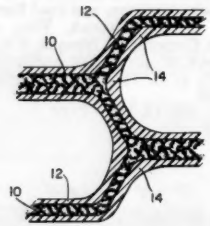
**3,788,938**
**PYROLYZED STRUCTURES**
**Whitney R. Adams, Wilmington, Del., assignor to Scott Paper Company, Philadelphia, Pa.**
**Application Apr. 10, 1969, Ser. No. 858,210, now Patent No. 3,676,173, which is a continuation of abandoned application Ser. No. 485,893, Sept. 8, 1965. Divided and this application Sept. 28, 1971, Ser. No. 98,491**
**Int. Cl. C23c** *9/06;* **D44d** *1/094*
**U.S. Cl. 161—159** **6 Claims**




Porous, cellular structures which have been at least partially carbonized, which have greater strength at high temperatures, and which are capable of withstanding higher temperatures than could the structures prior to pyrolysis. A method for forming the above structures in which a first basic structure having a desired configuration and comprised of material having a low fusion or deterioration temperature is coated at even lower temperatures with an infusible resin which is capable of being cured to an infusible state at a temperature lower than the fusion or deterioration temperature of the material compirsing the first basic structure, and the resulting coated structure is then subjected to elevated temperatures so that the basic structure is pyrolyzed and carbonized leaving a stronger, high-temperature-resistant structure substantially in the image of the first basic structure.

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**3,788,939**
**HIGH DIELECTRIC ELECTRONIC PACKAGING MATERIAL**
**Harold Daniel Dove, 11812 Daniel Ave., Garden Grove, Calif. 92640**
**No Drawing. Filed July 17, 1972, Ser. No. 272,695**
**Int. Cl. B32b** *5/16*
**U.S. Cl. 161—93** **6 Claims**

Electronic interconnection and packaging materials must have electrical characteristics which match the electrical requirement of the total system if maximum performance is to be expected. Among the characteristics of the interconnection material is the dielectric constant of the insulating material. High dielectric constant insulating materials are desirable to provide a filtering function which is integral with the interconnection system. The present invention provides a new insulating material with a high dielectric constant for improved filter characteristics.

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**3,788,940**
**POLYOLEFIN-POLYAMIDE COMPOSITE FILAMENTS HAVING AN IMPROVED ADHERING PROPERTY AND A METHOD THEREOF**
**Fumimaro Ogata, Osaka, and Katsuhiko Nagamine, Settsu, Osaka-fu, Japan, assignors to Kanegafuchi Boseki Kabushiki Kaisha, Tokyo, Japan, and Snia Viscosa Societa Nazionale Industria Applicazioni Viscosa S.p.A., Milan, Italy**
**No Drawing. Continuation-in-part of abandoned application Ser. No. 605,170, Dec. 28, 1966. This application July 11, 1969, Ser. No. 841,146**
**Int. Cl. D02g** *3/00*
**U.S. Cl. 161—173** **6 Claims**

Composite filaments of a polyolefin and a polyamide which are highly crimpable without separation or cleavage are produced by the conjugate spinning of (1) a molten fiber-forming polyamide selected from the group consisting of nylon-11 nylon-12, nylon-11.10, nylon-11.11 and nylon-11.12 and (2) a molten fiber-forming polyolefin selected from the group consisting of polyethylene and polypropylene. The conjugate spinning ratio of the two polymeric materials which are employed to form the composite filaments is maintained between 8:2 and 2:8, ratios outside such range involving difficulties. Additionally, in using heat to effect the crimping, the temperature is maintained between about 70° and about 150° C.

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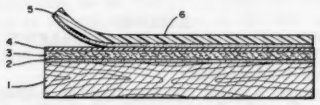
**3,788,941**
**REMOVABLE FLOOR AND WALL SURFACE COVERINGS**
**John J. Kupits, Newtown, Pa., assignor to W. R. Grace & Co., Cambridge, Mass.**
**Continuation of abandoned application Ser. No. 872,997, Oct. 31, 1969. This application Aug. 2, 1971, Ser. No. 168,414**
**Int. Cl. B32b** *9/04*
**U.S. Cl. 161—182** **7 Claims**

Subfloors and walls, for example, can be covered with a surface covering which is easily removable at a later time by adhering a release composition-coated flexible

sheet material, for example, an elastomer-impregnated paper sheet, release-coated side up, to the sub-floor or wall



and then adhesively securing the surface covering to the release coated sheet.

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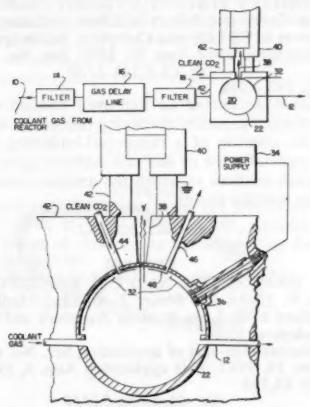
**3,788,942**

**BURST CARTRIDGE DETECTION SYSTEM FOR USE WITH GAS-COOLED REACTORS**

**Kyung Ho Hyun, Seoul, Korea, assignor to Korea Institute of Science & Technology, Seoul, Korea**

**Filed Sept. 29, 1970, Ser. No. 76,497**
**Claims priority, application Korea, Oct. 14, 1969, 1,341**
**Int. Cl. G21c *17/04***
**U.S. Cl. 176—19 LD** **9 Claims**




A burst cartridge detection system for use with gas-cooled power reactors includes a pressure vessel having a sampling chamber with an electrode positioned within the chamber for preventing the build-up of daughter products within the chamber. Two filters and a delay line are in fluid communication with the chamber, and a collimator connects a scintillation detector with the chamber whereby predetermined types of radiation within the coolant gas, such as gammas from fission products within the reactor, are detected.

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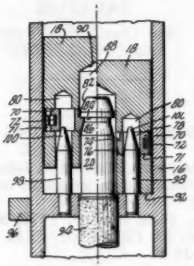
**3,788,943**

**AUTOMATIC CONTROL ROD LATCHING DEVICE**

**Angelo J. Misenti and Gennaro V. Notarl, Simsbury, Conn., assignors to Combustion Engineering, Inc., Windsor, Conn.**

**Filed Dec. 19, 1969, Ser. No. 886,574**
**Int. Cl. G21c *7/00***
**U.S. Cl. 176—35** **12 Claims**

An automatic release for nuclear reactor control rod actuating mechanism carried by a removable, nuclear vessel head. A reciprocable actuator telescope with a control rod extension and is releasably connected thereto by spring pressed transversely sliding latches in the actuator. Near the bottom of the actuator stroke stationary taper pins enter axially extending holes in the actuator and start to enter misaligned holes in the latches. At the bottom of the actuator stroke the taper pins having passed through the misaligned holes in the latches have automatically withdrawn the latches and disconnected the rod extension so that the head and actuator may be removed as a unit



leaving the control rod in the reactor. Upward movement of the actuator from the bottom of its stroke with the head in place will move this actuator away from the taper pins and automatically release the latches and latch the actuator to the control rod.

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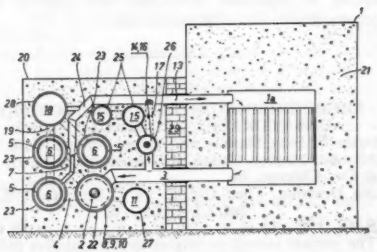
**3,788,944**

**NUCLEAR POWER PLANT HAVING A CLOSED GAS COOLING CIRCUIT**

**Wilfried Stracke, Oberehrendingen, and Max Zimmermann, Untersiggenthal, Switzerland, assignors to Aktiengesellschaft Brown, Boveri & Cie., Baden, Switzerland**

**Filed Mar. 8, 1971, Ser. No. 122,019**
**Claims priority, application Switzerland, Mar. 9, 1970, 3,395/70**
**Int. Cl. G21c *13/00***
**U.S. Cl. 176—60** **4 Claims**



In a nuclear power plant of the type having a closed gas coupling circuit, a high temperature reactor is enclosed by one concrete pressure structure; enclosed by

another concrete structure separate from and adjacent to the reactor are the related operating components of the power plant such as turbine and compressor units, coolers, heat exchangers, etc., and the housing structures of these individual operating components, such as those which enclose and support the guide blading of the turbo-machines (turbines and compressors), as well as all interconnecting pipe lines and the pipe lines to and from the reactor serve as lost i.e. cast in forms around which concrete is poured on the construction site thereby to form a machine block. The drive shaft from the turbine projects outwardly from the machine block for connection to the electric generator.

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**ERRATUM**

For Class 195—11 see:
Patent No. 3,788,910

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**3,788,945**
**PROCESS FOR ISOMERIZING GLUCOSE TO FRUCTOSE**

**Kenneth N. Thompson, Richard A. Johnson, and Norman E. Lloyd, Clinton, Iowa, assignors to Standard Brands Incorporated, New York, N.Y.**

**No Drawing. Filed Nov. 9, 1970, Ser. No. 88,190**
**Int. Cl. C07g *7/02*; C13k *9/00***
**U.S. Cl. 195—31 F** **19 Claims**

The disclosure is directed to a process of enzymatically converting glucose to fructose. A glucose-containing solution is passed, under specific conditions, through a bed of glucose isomerase bound to an inert carrier.

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**3,788,946**
**PROCESS FOR THE PREPARATION OF AMYLOSE AS THE SUBSTRATE FOR THE QUANTITATIVE ANALYSIS OF AMYLASE**

**Masahi Kurimoto and Mikihiko Yoshida, Okayama, Japan, assignors to Hayashibara Company, Okayama, Japan**

**Filed July 28, 1971, Ser. No. 166,750**
**Claims priority, application Japan, July 28, 1970, 45/66,003**
**Int. Cl. C12b *1/00***
**U.S. Cl. 195—31 R** **3 Claims**

The invention deals with a method of preparation of amylose which gives an excellent substrate for the quantitative analysis of amylase, especially for that in blood serum. The outline of the preparation process is that the gelatinized starch or waxy-starch is converted into linear chain amyloses by the aid of alpha-1,6-glucosidase, and through precipitation and fractionation the linear chain amylose, which is water-soluble and very sensitive to amylase, is separated from the only slightly soluble macromolecules and oligosaccharides.

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**3,788,947**
**MICROBIOLOGICAL REDUCTION OF 10(11) UNSATURATED PROSTAGLANDINS**

**Charles F. Hsu, Skokie, and James Jiu and Seth Setsuo Mizuba, Morton Grove, Ill., assignors to G. D. Searle & Co., Chicago, Ill.**

**No Drawing. Filed Oct. 5, 1972, Ser. No. 295,209**
**Int. Cl. C12d *1/02***
**U.S. Cl. 195—51 R** **28 Claims**

The present invention relates to fermentative reduction of the 10(11) double bond of PGA-type prostaglandins. More particularly, the invention provides a process for selective 10(11) double bond reduction of $PGA_2$ by fungi of genera Cunninghamella, Mucor, Polyporus, Sphaeropsis, Stemphylium, Cladosporium, Hormodendrum, Epicoccum, Fusarium, Gliocladium, Dactylium, Cephalosporium, Aspergillus, and Penicillium. The same transformation is accomplished by bacteria of genera Bacillus, Enterobacter, Escherichia, and Proteus.

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**3,788,948**
**METHOD OF BINDING, BY COVALENT BONDS, PROTEINS AND POLYPEPTIDES TO POLYMERS USING CYANATES**

**Sven Lennart Kagedal and Stig Hjalmar Johannes Akerstrom, Uppsala, Sweden, assignors to Pharmacia AB, Uppsala, Sweden**

**No Drawing. Continuation-in-part of abandoned application Ser. No. 783,761, Dec. 13, 1968. This application Oct. 12, 1971, Ser. No. 188,575**
**Claims priority, application Sweden, Dec. 20, 1967, 17,469/67**
**Int. Cl. C07g *7/00, 7/02***
**U.S. Cl. 195—68** **12 Claims**

Organic cyanate compounds are employed for binding organic compounds containing a primary or secondary amino group to polymers containing one or more hydroxyl and/or primary and/or secondary amino groups. The invention is useful, among other things, for binding water soluble enzymes to water insoluble polymers while preserving the activity of the enzyme.

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**3,788,949**
**STERILITY TESTING ANTIGEN PRODUCTS**

**Katsuto Kojiro and Robert A. Elliott, Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.**

**No Drawing. Filed Aug. 22, 1972, Ser. No. 282,791**
**Int. Cl. C12k *1/10***
**U.S. Cl. 195—100** **6 Claims**

We have discovered an improved method of sterility testing antigen products containing thimerosal which comprises the addition of a thimerosal-inhibiting concentration of penicillamine or the acid addition salts thereof to the growth medium in which the antigen product is cultured for sterility testing.

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**3,788,950**
**ENZYME GEL AND USE THEREFOR**

**George P. Hicks and Stuart J. Updike, Madison, Wis., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.**

**Continuation-in-part of application Ser. No. 631,716, Apr. 18, 1967. This application Aug. 5, 1970, Ser. No. 61,333**
**Int. Cl. G01n *31/14***
**U.S. Cl. 195—103.5 R** **17 Claims**

A substantially rigid enzyme gel, useful in processes incorporating enzyme catalysts, such as, substrate analysis, comprising a polymer matrix having water colloidally dispersed therein and active enzyme molecules distributed homogeneously throughout and substantially unreacted with the polymer matrix, the polymer matrix having a sufficiently small pore size to retain individual enzyme molecules, i.e. the enzyme in aqueous solution. The gel is formed by polymerizing an aqueous solution of a monomer, for example an acrylamide, containing an enzyme under conditions not detrimental to the activity of the enzyme.

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**3,788,951**
**METHOD FOR GROWING MONOCULTURES**

**Hans J. von der Pfordten, 3463 Ashton Court, Palo Alto, Calif. 94306**

**Filed Dec. 7, 1971, Ser. No. 205,608**
**Int. Cl. C12b *1/02***
**U.S. Cl. 195—120** **11 Claims**

A method for growing monocultures wherein a strip of a nutrient material covered by a protective film is inoculated with micro-organisms by removing a portion of the

film from the strip, inoculating the film with the micro-organisms, spreading the micro-organisms to separate them from each other, and moving the inoculated film back into contact with the strip to cause the separated micro-organisms to be transferred onto the same. The spreading of the micro-organisms on the film is accomplished by moving a spreading member along the spiral path which intersects an arcuate swath containing a mass of such micro-organisms. A technique for casting the strip with and without an associated antibiotic layer is also disclosed.

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3,788,952

## APPARATUS FOR CONTROLLING THE FERMENTATION OF VOLATILE ORGANIC COMPOUNDS

**Yutaka Iida, Tokyo, and Kazuo Hishinuma, Motohiko Hikuma, Tadashi Shirakawa, and Susumu Sakai, Kawasaki-shi, Kanagawa-ken, Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan**

**Continuation-in-part of abandoned application Ser. No. 82,473, Oct. 20, 1970. This application Jan. 13, 1971, Ser. No. 106,060**

**Claims priority, application Japan, Oct. 27, 1969, 44/85,841**

**Int. Cl. C12k** *1/00*

**U.S. Cl. 195—127** **3 Claims**

A fermentation process in which an organic compound volatile with water vapor is consumed by a microorganism or an enzyme in an aqueous medium is controlled by continuously sampling the medium, vaporizing the sample stream, and feeding the vaporized material to a flame ionization detector. The conductivity of the flame indicates the concentration of the organic compound in the medium and provides a signal for controlling replenishment of the medium with the organic compound.

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3,788,953

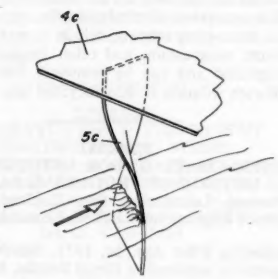
## TURBULENCE PROMOTOR SYSTEM

**Arthur L. Kohl, Woodland Hills, Calif., assignor to the United States of America as represented by the Secretary of the Interior**

**Filed Apr. 5, 1971, Ser. No. 131,232**

**Int. Cl. B01d** *3/00, 3/02, 3/14*

**U.S. Cl. 202—173** **6 Claims**




In a direct contact condensation system wherein vapor condenses upon a flowing shallow stream of cooler liquid, the flow of the uppermost layer of the liquid stream is disrupted without disrupting the flow of the main body of the stream so as to agitate and turn over the uppermost layer, and move the uppermost layer downward to a region where the natural turbulence of the flowing stream will further agitate and break up said layer.

3,788,954

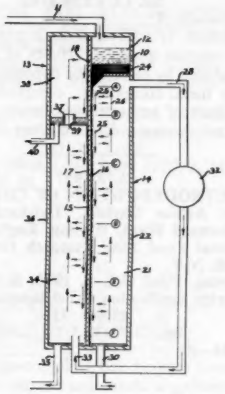
## INTERPHASE MASS TRANSFER PROCESS FROM LAMINA FLOWING FILMS .005 IN. THICK

**C. M. Cantrell, Richland, Wash., assignor of a fractional part interest to John P. Petrek, Kennewick, Wash.**

**Filed June 24, 1970, Ser. No. 49,419**

**Int. Cl. B01d** *1/22, 3/00, 3/02, 3/08, 3/10, 3/28*

**U.S. Cl. 203—89** **17 Claims**



An interphase mass transfer process and apparatus is described for separating components in a binary or multicomponent fluid in which the components have different vapor pressures and are transferred between their liquid and vapor phases. The liquid phase is spread into a film on a heat transfer surface and is directed over the surface in one direction. The vapor phase is directed over the film countercurrent to the flow and in intimate contact with the film with the liquid and vapor phases being in thermodynamic equilibrium. Simultaneously, heat is transferred between the surface and the film to transfer additional mass between the phases as the phases are flowing in thermodynamic equilibrium countercurrent to each other.

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3,788,955

## ENCAPSULATION

**Nelson A. Crites and Glenn R. Schaer, Columbus, Ohio, assignors to Battelle Development Corporation, Columbus, Ohio**

**No Drawing. Continuation-in-part of abandoned application Ser. No. 117,059, Feb. 19, 1971. This application Oct. 7, 1971, Ser. No. 187,560**

**Int. Cl. B01i** *13/02;* **C23b** *5/56, 17/00*

**U.S. Cl. 204—25** **26 Claims**

Encapsulation of liquids with metal. A core liquid is dispersed in a carrier liquid in which it is essentially insoluble (one of the liquids being aqueous), in a container whose surface is phobic to the core liquid. Metallizing and reducing compounds are added. Nucleating metal is deposited at the interface between the liquids by introducing a surfactant-type metal-organic compound of the hydrophobic-hydrophilic type having a more readily oxidizable metal ion than the metal of the metallizing agent, so that molecules of the surfactant align themselves at the interface and present their metal ions to the aqueous liquid to nucleate deposition of metallizing ions. In one embodiment, the metallizing materials are disposed to deposit a noble metal at the interface, and the resulting noble-metal-coated capsules are subsequently over-coated with one or more layers of a non-noble metal by electrodeposition.

## 3,788,956
## ELECTROLYTIC COLORING OF ANODIZED ALUMINUM

**Jos Patrie, Grenoble, Jacques Lefebvre, Voiron, Roger Segond, Saint-Cloud, and Michel Badia, Echirolles, France, assignors to Cegedur Societe de Transformation de l'Aluminum Pechiney, Paris, France**

**No Drawing. Filed June 23, 1972, Ser. No. 265,653**
**Claims priority, application France, June 25, 1971, 7123388; Sept. 10, 1971, 7132743**
**Int. Cl. C23b** *9/02*
**U.S. Cl. 204—35 N** **9 Claims**

This invention is addressed to a process for electrochemically coloring anodized articles of aluminum or alloys of aluminum by electrolytic deposition of heavy metals or heavy metal compounds, comprising mounting the article in a bath of an aqueous solution of a given metal sulfamate and passing a direct current through the bath.

## 3,788,957
## ELECTRODEPOSITION OF CHROMIUM

**Ian Robert Arthur Christie, Twickenham, and John Joseph Bernard Ward, Welling, England, assignors to International Lead Zinc Research Organization, Inc., New York, N.Y.**

**No Drawing. Filed Oct. 2, 1972, Ser. No. 293,860**
**Claims priority, application Great Britain, Sept. 30, 1971, 45,669/71**
**Int. Cl. C23b** *5/06, 5/46*
**U.S. Cl. 204—51** **13 Claims**

An improved method and an improved electrolyte solution for providing a chromium coating on a metal substrate. The metal coatings are provided by electrodepositions from solutions comprising water, dimethylformamide, trivalent chromium ions, halide ions, ammonium ions, and a cationic surfactant selected from the group consisting of tetraalkylammonium salts and substituted imidazoline.

## 3,788,958
## AQUEOUS ELECTROLYTIC STRIPPING BATH

**Horst Dillenberg, 26 Kaiser-Wilhelm-Allee, 56 Wuppertal-Elberfeld, Germany**

**No Drawing. Filed June 1, 1972, Ser. No. 258,675**
**Claims priority, application Germany, June 23, 1971, P 21 31 078.1**
**Int. Cl. B01k** *1/00;* **C22b** *1/20*
**U.S. Cl. 204—146** **4 Claims**

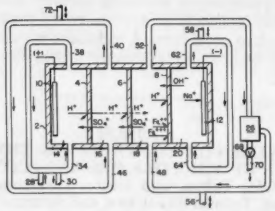
An aqueous bath for the electrolytic stripping of coatings of silver, gold, chromium or nickel oxide from support bodies made of copper, copper alloy, tin alloy, stainless steel or high temperature alloys, the bath comprising as a main component over 80% sulfuric and/or sulfonic acid and as an additional component, an alcohol such as methanol or ethanol which does not enter into an olefin binding with sulfuric or sulfonic acid. Preferably the bath contains from about 800 up to about 940 cc. sulfuric and/or sulfonic acid and about 200 down to about 60 cc. alcohol per liter of bath and may contain as a further additional component, an aromatic hydrocarbon compound with at least one nitro group (—$NO_2$) bound directly to the benzene nucleus such as mononitrobenzene, trinitrobenzene, mononitrotoluene and/or nitrobenzoic acid.

## 3,788,959
## ELECTRODIALYTIC RECOVERY OF ACID AND INSOLUBLE PRODUCTS FROM SPENT LIQUORS

**Richard N. Smith, East Norwalk, Conn., assignor to Sybron Corporation, Rochester, N.Y.**

**Filed May 5, 1972, Ser. No. 250,625**
**Int. Cl. B01d** *13/02;* **C02c** *5/12*
**U.S. Cl. 204—180 P** **40 Claims**

A multi-chambered electrodialytic apparatus and process are used to recover excess free acid and to regenerate and concentrate acid from spent liquors, e.g., spent pickle liquors. Sulfuric acid and hydrochloric acid are recovered and regenerated from their respective iron and steel pickle liquors along with oxides and hydroxides of iron. Efficiency for the recovery of the sulfuric or hydrochloric acids from the spent pickle liquor is greatly improved by using an electrodialytic apparatus having in sequence

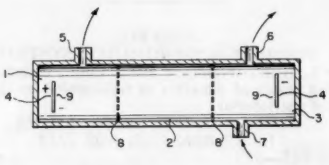


an anode chamber, at least one concentrating chamber, a spent liquor chamber and a cathode chamber. A sequestrant is used in the catholyte to prevent membrane fouling. Other values are recovered depending upon the makeup of the spent liquors.

## 3,788,960
## RECYCLING OF ION EXCHANGE REGENERANT CHEMICALS

**Arvind S. Patil, Columbia, Md., and John Jacob Singer, Jr., Hollis, N.H., assignors to W. R. Grace & Co., New York, N.Y.**

**Filed Feb. 16, 1973, Ser. No. 333,417**
**Int. Cl. B01d** *13/02;* **C01f** *11/14*
**U.S. Cl. 204—180 P** **6 Claims**



A method of recycling ion exchange regenerant chemicals which comprises electrolyzing the regenerant chemicals in a three-compartment cell in a manner such that the calcium, magnesium, and other impurity metal ions are precipitated and can be removed. The resulting sodium chloride solution is then recycled into the system.

## 3,788,961
## PLASTIC COATINGS FOR ARTICLES AND A METHOD OF PRODUCING SAME

**Alan Buxton, Leamington Spa, England, assignor to Associated Engineering Limited, Leamington Spa, England**

**No Drawing. Filed Apr. 30, 1971, Ser. No. 139,177**
**Claims priority, application Great Britain, May 11, 1970, 22,741/70**
**Int. Cl. B01k** *5/02;* **C23b** *13/00*
**U.S. Cl. 204—181** **4 Claims**

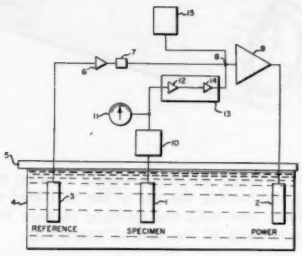
A method of producing a plastic coating on an article is disclosed which consists in arranging the article as the anode immersed in an electrolyte in an electrophoretic cell, the electrolyte including a codispersion of the plastic and a finely divided solid, passing an electric current through the cell until an adequately thick layer of the intermixed plastic and solid has been deposited on the article, drying the article and the deposited layer and heating the layer until it fuses or coalesces.

3,788,962

## APPARATUS FOR MONITORING THE CORROSION RATE OF METAL BY THE POLARIZATION RESISTANCE METHOD

John Parsons Frenck, Newark, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Nov. 11, 1971, Ser. No. 197,876
Int. Cl. G01n 27/46
U.S. Cl. 204—195 C 1 Claim



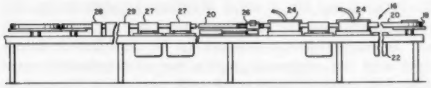

An apparatus for monitoring the corrosion rate of metal in a plant stream by its polarization resistance featuring automatic means to reduce current flow through a metal specimen electrode before subjecting it to programmed polarization potentials. Spurious signals due to circuit oscillation are limited by using a current-to-voltage transducer that introduces essentially zero impedance in the current circuit to produce a functional voltage proportional to specimen electrode current. The functional voltage indicates corrosion rate by meter and alarm, and is inverted and amplified at moderate gain to provide an automatic current reduction signal through an isolating sample-and-hold circuit. By a timing sequence the summing point of an operational amplifier receives both an input proportional to the inverted and amplified functional voltage and a continuously transmitted reference voltage from a freely corroding reference electrode during a first time period. Additional programmed polarization voltages are introduced for summing during a second time period to establish polarization resistance. Circuit stability resulting from the use of low impedance components and restricted transmission of oscillations between circuit loops permits reliable monitoring of the corrosion of a wide variety of troublesome passive metals that form thin oxide films of high electrical capacity.

3,788,963

## APPARATUS FOR INTERMITTENT ELECTROPLATING STRIPS

Leo N. Kosowsky, Sharon, and Curtis N. Lovejoy, Walpole, Mass., and John G. Cunniff, Foster, R.I., assignors to Auric Corporation, Newark, N.J.

Filed Jan. 13, 1972, Ser. No. 217,508
Int. Cl. C23b 5/68
U.S. Cl. 204—206 19 Claims



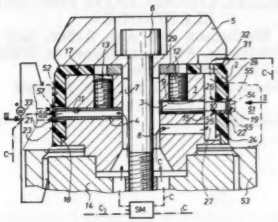
Apparatus for electroplating selected areas on consecutive segments of metal strip, the apparatus comprising means to advance the strip, means for isolating inertial movement of the strip to hold the strip in a fixed position at all times advancement is not required, and an electroplating cell formed of two parts adapted to clamp together hydraulically isolating all but the aforesaid selected areas from contact with the electroplating fluid. In one embodiment of the invention there is an electronic means to sense whether the proper advancement of the strip has been achieved.

3,788,964

## ARRANGEMENT FOR ELECTRO-CHEMICAL TREATMENT OF AN ELECTRICALLY CONDUCTIVE WORKPIECE

Hanns Kurz, Stuttgart, and Siegfried Linder, Ditzingen, Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Apr. 26, 1972, Ser. No. 247,620
Claims priority, application Germany, Apr. 29, 1971, P 21 21 110.9
Int. Cl. B01k 3/04; B23p 1/02, 1/12
U.S. Cl. 204—224 M 8 Claims



An electrically insulating sleeve is dimensioned so that it can be accommodated in a bore of an electrically conductive workpiece with the latter having one or more recesses extending from the surface bounding the bore. The sleeve engages the bore surface tightly in the region of the open end of the bore and also about the recess or recesses. The sleeve has an aperture associated and adapted to be placed in registry with each recess, and an electrically conductive working electrode is to be at least in part accommodated in this sleeve. The electrode has a passage for each of the apertures, being longitudinally aligned with the same and accommodating an electrically conductive insert slidable between a retracted position and a plurality of advanced positions in each of which the insert extends to different depths into the aperture. A source of DC current is connected with its negative pole with the working electrode and with its positive pole with the workpiece and a supply arrangement circulates a flow of liquid electrolyte in a path which includes the passage or passages and insert.

3,788,965

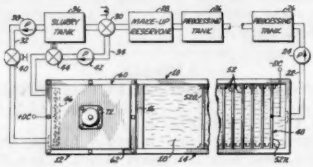
## HYDROMETALLURGICAL SOLUBILIZER WITH SELECTIVE ELECTROPLATING MECHANISM

Wilmar G. Holsinger, Phoenix, Ariz., assignor to 2C–2B Corporation, Phoenix, Ariz.

Filed Apr. 7, 1972, Ser. No. 242,086
Int. Cl. B01k 3/00, 3/10
U.S. Cl. 204—234 12 Claims

A container of conductive solution is divided into a first compartment and a second compartment by an inert permeable barrier. The solution is electrochemically activated to produce and control the pH of an acidic solution within the first compartment and a basic solution within the second compartment. Pulverized ore is deposited within the acidic compartment and reacts therein with the acid to solubilize the metals and most metal compounds contained within the ore. The solubilized metal

compounds are carried through the barrier into the basic compartment by ionic flow and fluid flow. A plurality of metal plates are located within the basic chamber for



plating out a selected one of the metals as determined by the chemical composition of the solution and the voltage drop across each of the plates.

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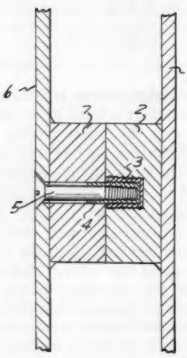
**3,788,966**

## ELECTRICAL CONNECTIONS FOR METAL ELECTRODES

**Orlando W. Stephenson III, Ann Arbor, and John E. Schmidt, Southgate, Mich., assignors to BASF Wyandotte Corporation, Wyandotte, Mich.**

**Filed June 7, 1972, Ser. No. 260,394**
**Int. Cl. B01k** *3/10*
**U.S. Cl. 204—256** **6 Claims**



The joining in electrical connection under corrosive conditions of a part made of titanium and a part made of steel by the use of engaging threads or lugs is difficult. However if each part is first coated with a layer of softer but compatible non-oxidizing metal, then the two parts can be joined together in a tight electrical/mechanical joint. A typical system is a platinum coating for titanium and either silver or nickel under copper for steel.

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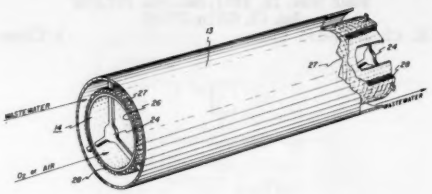
**3,788,967**

## WASTEWATER TREATMENT USING ELECTROLYSIS WITH ACTIVATED CARBON CATHODE

**Masayuki Kawahata, Scotia, and Kenneth R. Price, Schenectady, N.Y., assignors to General Electric Company**

**Original application Feb. 3, 1969, Ser. No. 795,917. Divided and this application Oct. 20, 1971, Ser. No. 191,103**
**Int. Cl. B01k** *3/08*
**U.S. Cl. 204—277** **3 Claims**

An improvement in the electrolytic treatment of wastewater is described in which the reduction of oxygen on an activated carbon cathode is employed to form hydrogen peroxide, which in turn serves to oxidize organic carbon pollutants in the wastewater. The oxygen is fed to the activated carbon cathode from outside the electrolytic



cell, with the cathode member defining at least part of the enclosure for feeding the gas to the activated carbon cathode surface, and with the cathode surface forming part of the boundary of the cell compartment.

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**3,788,968**

## LAYERED ELECTRODE

**Jürgen Müller, Frankfurt am Main, and Karl Lohrberg, Heusenstamm, Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Germany**

**No Drawing. Filed Dec. 29, 1971, Ser. No. 213,847**
**Claims priority, application Germany, Jan. 8, 1971, P 21 00 652.0**
**Int. Cl. B01k** *3/06;* **C01b** *11/26*
**U.S. Cl. 204—290 R** **4 Claims**

An electrode, especially useful as an anode in the electrolysis of alkali metal chlorides, includes a graphite body, a first surface covering of a hard ceramic such as titanium carbide or titanium nitride and at least one metal and/or metal oxide of the platinum group and a second oxide coating which is electrically porous and resistant to the electrolysis conditions.

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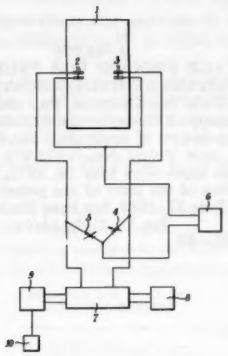
**3,788,969**

**Vittorio Di Stefano and Paolo Marini, Rome, Italy, assignors to Centro Sperimentale Metallurgico S.p.A., Rome, Italy**

**Filed July 26, 1971, Ser. No. 166,114**
**Claims priority, application Italy, Sept. 4, 1970, 53,219/70**
**Int. Cl. B01k** *5/00*
**U.S. Cl. 204—299** **11 Claims**

A quantitative analyzing device for liquid-solid chromatography or electrophoresis, comprising a sensitive element detecting variations of a characteristic value of the chromatographic layer-eluent-eluate system, which value is a function of the concentration of the eluate in the eluent, a rigid protecting support, where said sensitive element is inserted, and wherein the contact between said sensitive element and the chromatographic layer is effected by means of said support. Method for the quantitative determination of chemical species separated by liquid-solid chromatography or electrophoresis, wherein a flow of a liquid eluent medium, or, respectively, a potential difference, is set on a solid chromatographic layer, the flow quantity and the distribution of said eluent on said layer is stabilized, the mixture to be analyzed is introduced and the chromatographic or electrophoretic separation of the components of said mixture is allowed to occur, the quantitative determination of one of them being performed, while the elution process is in progress, by means of the measurement of the variations of a value which is a function of the chemical species concentration in the eluent, said measurement being per-

formed in a limited zone of the chromatographic layer and said concentration variations of the chemical species



under examination occurring because of the passage of said species in said zone of the chromatographic layer.

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**3,788,970**

## COKE SUPPRESSING ADDITIVE

**Reese A. Peck and Raymond F. Wilson, Fishkill, N.Y., assignors to Texaco Inc., New York, N.Y.**

**No Drawing. Continuation-in-part of application Ser. No. 787,566, Dec. 27, 1968, now Patent No. 3,591,484. This application June 24, 1970, Ser. No. 49,513**

**Int. Cl. C10c** *3/04*

**U.S. Cl. 208—22** **5 Claims**

A coke suppressing additive is prepared by contacting an oxidized heavy hydrocarbon fraction with an aromatic polycarboxylic acid and/or anhydride producing compound in the presence of an oxidant followed by treatment with hydrogen. The additive is particularly useful for suppressing coke formation in a hydrocracking process.

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**3,788,971**

## PRODUCTION OF HIGH QUALITY BLENDED JET FUELS

**Merritt C. Kirk, Jr., Thornton, Pa., assignor to Sun Oil Company, Philadelphia, Pa.**

**No Drawing. Continuation-in-part of application Ser. No. 799,499, Feb. 14, 1969, now Patent No. 3,594,307. This application Feb. 3, 1971, Ser. No. 112,465**

**Int. Cl. C10l** *1/04*

**U.S. Cl. 208—57** **8 Claims**

A low smoke point (e.g., 29) jet fuel can be used to produce a higher smoke point fuel (e.g. 40+) by blending with an additional more highly paraffinic fuel (e.g. high in $C_{10}$–$C_{12}$ normal paraffins) boiling mainly within the fuel oil boiling range (e.g. 10% point of at least 270° F. and 90% point less than 540° F.). A preferred group of paraffinic fuels comprises n-decane, n-dodecane, hydrogenated butylene and/or propylene polymers (e.g. trimer, tetramer) preferably hydrogenated propylene "tetramer" boiling mainly above 350° F. (e.g. 10% point of 360° F.). The preferred 29+ smoke point fuel for blending with n-dodecane or hydrogenated propylene tetramer is obtained by a two stage hydrogenation of a paraffinic straight run kerosene having an API gravity of at least 42, and containing 12–16 weight percent aromatics and at least 45 weight percent paraffins. The blended fuel also can have a desirably low freeze point. The n-paraffins can also be obtained by molecular sieve separation from a kerosene fraction.

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**3,788,972**

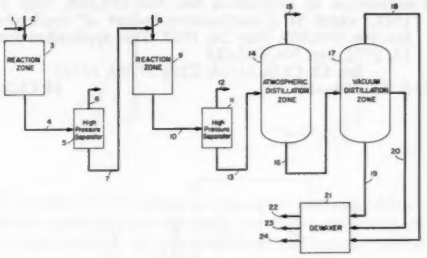
## PROCESS FOR THE MANUFACTURE OF LUBRICATING OILS BY HYDROCRACKING

**H. Clarke Henry and John B. Gilbert, Sarnia, Ontario, Canada, and John Sosnowski, Westfield, N.J., assignors to Esso Research and Engineering Company**

**Filed Nov. 22, 1971, Ser. No. 200,854**

**Int. Cl. C01b** *33/28;* **C10g** *37/02*

**U.S. Cl. 208—59** **18 Claims**




Lubricating oils having UV stability, low color intensity and uniform viscosity index ($VI_E$) distribution are prepared from hydrocarbon feedstocks in a two-stage process in which the feedstock is first hydrogenated and mildly hydrocracked over a first hydrocracking catalyst, and then further hydrogenated and hydrocracked over a second hydrocracking catalyst mixture comprising (1) an amorphous base component, (2) a crystalline aluminosilicate component preferably comprising 10–30 wt. percent of the total catalyst and having a $SiO_2$:$Al_2O_3$ mole ratio of at least 2.5 and an alkali metal content of less than about 2.0 wt. percent (as alkali oxide) and (3) a transition metal hydrogenation component.

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**3,788,973**

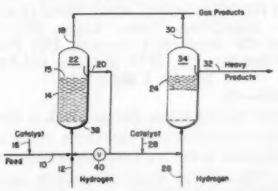
## HIGH CONVERSION HYDROGENATION

**Ronald H. Wolk, Lawrence Township, Mercer County, and Michael C. Chervenak, Pennington, N.J., and Seymour B. Alpert, Los Altos, Calif., assignors to Hydrocarbon Research, Inc., New York, N.Y.**

**Filed Dec. 23, 1971, Ser. No. 211,615**

**Int. Cl. C10g** *9/16, 31/14, 37/02*

**U.S. Cl. 208—59** **4 Claims**




A high conversion hydrogenation process for converting a petroleum residuum having at least 25 percent by vol-

ume boiling above 975° F. to material boiling below 975° F. takes place in a series of ebullated bed reactors. At least 65 percent of the metals in the residuum fed to the first reactor is deposited on the catalyst in the first reactor. The reactors are operated within 25° F. of one another to accomplish this. The ratio of the products boiling in the 392° to 750° F. range is maintained at less than twice that of the products boiling in the $C_4$ to 392° F. range.

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**3,788,974**

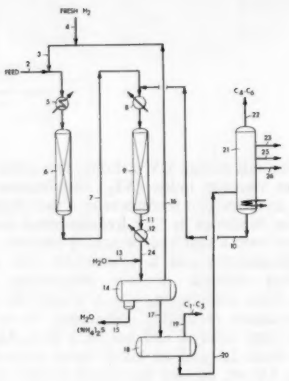
## HYDROCRACKING PROCESS UTILIZING MIXED NONNOBLE METAL CATALYST

**Fred J. Buchmann and Clarence M. Eidt, Jr., Baton Rouge, Ralph B. Mason, Denham Springs, and Glen P. Hamner, Baton Rouge, La., assignors to Esso Research and Engineering Company**

**Continuation of application Ser. No. 850,680, Aug. 15, 1969, which is a continuation-in-part of application Ser. No. 640,859, May 24, 1967. This application June 13, 1972, Ser. No. 262,223**

**Int. Cl. C01b *33/28*; C10g *37/02, 13/06***

**U.S. Cl. 208—59** **15 Claims**



A hydrocracking process which uses a mixed nonnoble metal catalyst composite on a crystalline aluminosilicate zeolite cracking bar. The singular catalyst employed in the process comprises nickel-tungsten on the hydrogen form of a crystalline aluminosilicate zeolite having a uniform pore diameter, a crystal structure that of faujasite and a silica to alumina mole ratio greater than about 3.

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**3,788,975**

## SIMULTANEOUS PRODUCTION OF AROMATIC HYDROCARBONS AND ISOBUTANE

**George R. Donaldson, Tower Lakes, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.**

**Filed Sept. 30, 1971, Ser. No. 185,025**

**Int. Cl. C10g *37/10***

**U.S. Cl. 208—60** **4 Claims**

A naphtha boiling range charge stock is converted into aromatic hydrocarbons and isobutane via a combination process involving hydrocracking, separation and catalytic reforming. The charge stock is initially subjected to a novel form of hydrocracking to produce a product predominantly comprising naphthenic hydrocarbons and highly branched paraffins, the majority of the latter being isobutane. Following separation to recover the isobutane and to provide a heptane-plus normally liquid stream, catalytic reforming is utilized to dehydrogenate the naphthenic compounds in the latter to produce an aromatic concentrate.

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**3,788,976**

## MULTI-STAGE PROCESS FOR PRODUCING HIGH UR OIL BY HYDROGENATION

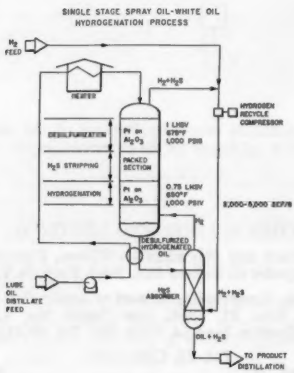
**Merritt C. Kirk, Jr., Thornton, Pa., assignor to Sun Oil Company of Pennsylvania, Philadelphia, Pa.**

**Continuation-in-part of application Ser. No. 16,495, Mar. 4, 1970, now Patent No. 3,673,078, dated June 27, 1972. This application May 18, 1972, Ser. No. 255,874**

**The portion of the term of the patent subsequent to June 27, 1989, has been disclaimed**

**Int. Cl. C10g *23/04***

**U.S. Cl. 208—89** **9 Claims**




Refined mineral oils (useful as textile oils, white oils and agricultural spray oils) which have a viscosity in the lubricating oil range and a volume percent unsulfonated residue (UR) of at least 94.5 (typically at least 96) are produced from a dewaxed raffinate of a distillate oil, preferably a substantially wax-free distillate, obtained from a crude oil classified as paraffinic or mixed-base by ASTM viscosity-gravity constant (VGC). One preferred distillate is a de-waxed raffinate having a UR less than 93. A preferred process for producing such a refined mineral oil (with a UR of at least 96) comprises (a) introducing a mineral oil distillate of lubricating viscosity into a reaction vessel containing a first reaction zone, a second reaction zone and an intermediate zone between said first and said second reaction zones; (b) contacting said distillate in said first zone with a hydrogen-rich gas and a catalytic amount of a sulfur-resistant hydrogenation catalyst to desulfurize said distillate; (c) passing the distillate from said first zone to said intermediate zone containing therein a packing material which is substantially inert to hydrogenation and wherein the flow of hydrogen is countercurrent to the flow of distillate whereby hydrogen sulfide which was formed in said first zone is stripped from said distillate; (d) contacting the desulfurized distillate in said second zone with hydrogen and a hydrogenation catalyst; (e) said contacting steps in said first and said second zones being conducted at a temperature of about 550 to 750° F. and a pressure in the range of 500–6000 p.s.i.g.; and (f) withdrawing mineral oil product from said second zone having an unsulfonatable residue of at least 96.

3,788,977

## HYDROCARBON CRACKING WITH BOTH AZEOLITE AND Pt-U-ALUMINA IN THE MATRIX

Geoffrey E. Dolbear, Columbia, and John S. Magee, Jr., Cooksville, Md., assignors to W. R. Grace & Co., New York, N.Y.

No Drawing. Continuation-in-part of applications Ser. No. 78,156, Oct. 5, 1970, and Ser. No. 92,917, Nov. 25, 1970, both now abandoned. This application June 1, 1972, Ser. No. 258,646

Int. Cl. B01j *9/20*; C01b *33/28*; C10g *11/00*
U.S. Cl. 208—120 3 Claims

Uranium oxide and platinum metal impregnated upon an inorganic oxide support is added to conventional zeolite promoted cracking catalyst to increase the formation of aromatics in conventional hydrocarbon cracking reactions.

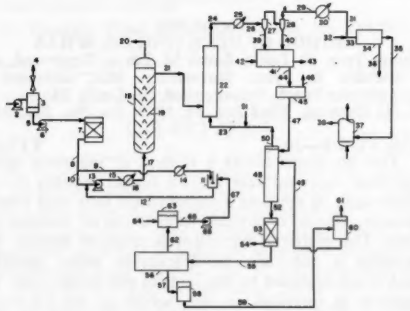
3,788,978

## PROCESS FOR THE DESULFURIZATION OF PETROLEUM OIL STOCKS

Roby Bearden, Jr., Baton Rouge, La., Robert B. MacMullin, Lewiston, N.Y., William E. Lewis, Baton Rouge, La., and Albert B. Welty, Jr., Westfield, N.J., assignors to Esso Research and Engineering Company

Filed May 24, 1972, Ser. No. 256,547

Int. Cl. C10g *17/00, 19/00*
U.S. Cl. 208—208 M 23 Claims



Low sulfur-content petroleum oil stocks are prepared by contacting a sulfur-containing oil stock with an alkali metal, preferably sodium, or an alkali metal alloy, preferably sodium/lead, to produce a mixture comprising a low sulfur oil and a mixture of alkali metal salts dispersed therein. The mixture of salts in oil is resolved by contacting the same with, preferably, 30–160 mole percent hydrogen sulfide based on total moles of salt in the oil, at a temperature of about 670° F. or above whereupon a salt phase separates from the oil. Thus separated the salt is blended with a molten sulfur-rich alkali metal polysulfide thereby forming a sulfur-depleted alkali metal polysulfide and liberating hydrogen sulfide. In another embodiment of the invention, molten sulfur may be used in place of the polysulfide. The sulfur-depleted polysulfide is then decomposed electrolytically to reform alkali metal and a sulfur-rich polysulfide, from which elemental sulfur is recovered.

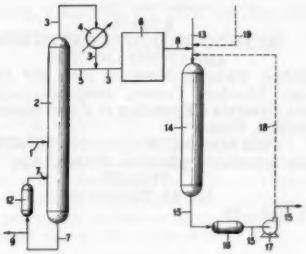
3,788,979

## PROCESS FOR UPGRADING DRIPOLENE

Edward G. Caflisch, South Charleston, Denvil E. Reed, Jr., Charleston, and Kenneth D. Williamson, St. Albans, W. Va., assignors to Union Carbide Corporation, New York, N.Y.

Filed Oct. 8, 1971, Ser. No. 187,690

Int. Cl. C07c *11/00*
U.S. Cl. 208—255 10 Claims



A process for providing a high octane blending component for gasoline from dripolene feedstocks containing dimers and codimers of cyclopentadiene and various methyl derivatives thereof by distilling, cracking, and hydrogenating under defined conditions including the use of an oxygen-free atmosphere and limited residence times in the distilling and cracking steps whereby hydrogenated monomers of the dimers and codimers are obtained in the dripolene thus upgrading it.

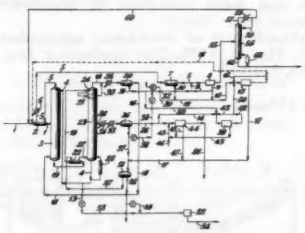
3,788,980

## PROCESS FOR THE SEPARATION OF AROMATIC HYDROCARBONS FROM A MIXED HYDROCARBON FEEDSTOCK

Daniel John Kubek, North Tarrytown, Alexander Jean-Marie Kosseim, Yorktown Heights, and George Solomon Somekh, New Rochelle, N.Y., assignors to Union Carbide Corporation, New York, N.Y.

Filed Dec. 21, 1971, Ser. No. 210,514

Int. Cl. C10g *21/16*
U.S. Cl. 208—333 16 Claims



The process involves a combination of solvent extraction-steam distillation for the recovery of aromatic hydrocarbons from a mixed feedstock. The feedstock is contacted with a solvent-water mixture at temperatures in the range of about 75° C. to 200° C. and the extract and

raffinate streams are separated into their components. The purity of the aromatics recovered from the extract is improved by introducing light aliphatic hydrocarbons consisting essentially of aliphatic and cycloaliphatic hydrocarbons having 6 carbon atoms with the feedstock at the middle theoretical stage of the extraction column. The light aliphatics are introduced in amounts in the range of 5 to 12 percent, based on the weight of the feedstock.

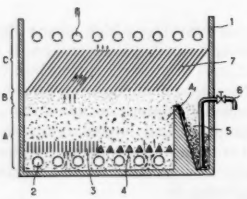
## ERRATA

For Classes 210—59 and 210—23 see:
Patents Nos. 3,788,468 and 3,788,469

## 3,788,981
## METHOD AND APPARATUS FOR TREATING LIQUIDS

**Yves Robert Richard, Marly le Roi, and Jean Marcel Mignot, Meudon, France, assignors to Degremont Societe Generale d'Epuration et d'Assainissement, Rueil Malmaison, France**

**Filed Mar. 30, 1972, Ser. No. 239,470**
**Claims priority, application France, Apr. 2, 1971, 7111693**
**Int. Cl. B01d** *37/04*
**U.S. Cl. 210—20** **7 Claims**

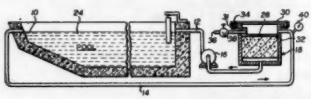


The method and apparatus of this invention make it possible to increase to 6 to 10 m./h. the upward flow rate of liquid to be treated in a single vessel according to the sludge-bed decantation process. The liquid is introduced homogeneously at the bottom of the vessel, so that it rises in lamellar fashion through the sludge and then through a separating section followed by an overlying finishing area comprising clusters of tubes, grids, grates, plates, for separating the entrained particles from the treated liquid.

## 3,788,982
## COLOR CONTROL OF WATER THAT IS RECIRCULATED

**Frank J. Zsoldos, Jr., 73 Florence Ave., Denville, N.J. 07834, and Anna Kowalski, 49 Meadowview Ave., Rockaway, N.J. 07866**

**Continuation-in-part of abandoned application Ser. No. 17,705, Mar. 9, 1970. This application Jan. 18, 1972, Ser. No. 218,712**
**Int. Cl. B01d** *37/02*
**U.S. Cl. 210—24** **7 Claims**



When water is confined in a large open tank and constantly recirculated through conventional filters as for example in swimming pools and aquariums, problems often arise due to the inadequacy of conventional filters that permit the slow accumulation therein at fractional parts per million levels, of the common heavy metal salts such as those of iron, copper and manganese and also the accumulation of microscopic planktonic algae which proceed to compromise the color and clarity of the water and additionally resulting in the staining of the main tank itself.

This invention adsorbs soluble ferrous, manganous, and cupric salts and planktonic algae from the water by augmenting conventional sand, carbon or diatomaceous earth filters with a special layer of adsorbent material consisting of a mixture of activated alumina and zinc dust. This adsorption is accomplished even in hard water without the concomitant removal of such hardness and thereby refraining from increasing the aggressiveness and corrosiveness of such water as regards the marbelized interiors of swimming pools or the metal plumbing of same.

## 3,788,983
## SELECTIVE SEPARATION OF CYANIDE FROM WASTE STREAMS BY ADSORPTION PROCESS

**William Fries, Southampton, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.**

**No Drawing. Filed Jan. 26, 1972, Ser. No. 221,040**
**Int. Cl. C02b** *1/62;* **C02c** *5/02*
**U.S. Cl. 210—28** **9 Claims**

This invention relates to the purification of industrial effluents and waste effluents in general, which contain cyanides. More particularly, the invention relates to the detoxification of such effluents by a treatment with a metallic ion which forms stable anionic complexes of cyanide, and the complete and selective removal of said complexes by an anion exchange resin.

## 3,788,984
## METHOD OF REMOVING OIL SPILLS

**James Teng, St. Louis, James M. Lucas, Crestwood, and Richard E. Pyler, Shrewsbury, Mo., assignors to Anheuser-Busch, Incorporated, St. Louis, Mo.**

**No Drawing. Filed Jan. 24, 1972, Ser. No. 220,385**
**Int. Cl. C02b** *9/02*
**U.S. Cl. 210—30** **9 Claims**

This disclosure covers a method of removing spilled oil from water surfaces without further injuring the environment, by applying a carbohydrate fatty acid ester in powder, fibrous, or granule form to the oil covered surface. The preferred ingredient is cellulose acetate. The additive is non-toxic, bio-degradable, water insoluble, and is not degraded by the acids in petroleum fuels. The additive is sprinkled on the surface of the oil coated water and after absorbing many times its weight in oil is easily removed. The picked up oil is easily removed from the cellulose acetate and up to 95% recovery of spilled oil is possible. The cellulose acetate also can be reused.

Cottonseed hulls and sawdust as the starting cellulose material are desirable because of low cost and the enhanced oil absorbing character of the resulting acetate.

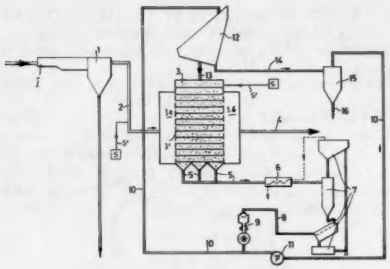
## 3,788,985
## METHOD OF CLEANING SOLIDS-CONTAINING SEWAGE

**Harald Jüntgen, Karl Knoblauch, and Dieter Zündorf, Essen, and Günther Gappa, Gelsenkirchen, Germany, assignors to Bergwerksverband GmbH, Essen, Germany**

**Filed Dec. 2, 1971, Ser. No. 204,043**
**Claims priority, application Germany, Dec. 16, 1970, P 20 61 877.3**
**Int. Cl. B01d** *15/02*
**U.S. Cl. 210—33** **12 Claims**

A mass of particulate adsorbent matter, such as activated carbon, is advanced at two speeds in a reactor from

the inlet to the outlet thereof, being continuously recirculated to the inlet. Into this moving column of adsorbent matter is admitted, transversely to the direction of movement of the column, a stream of sewage distributed



over at least substantially the length of the column. Solids are retained in a portion of the moving column advancing at a first speed and at the side opposite the entry side clarified liquid issues from the column.

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**3,788,986**

## PRODUCTION OF NITROGEN- AND PHOSPHORUS-CONTAINING COMPOUNDS

**Brian Garner Bennett, Liverpool, and William Samuel Holmes, Wolverhampton, England, assignors to Albright & Wilson Limited, Oldbury, near Birmingham, Warwickshire, England**

**No Drawing. Filed Sept. 13, 1972, Ser. No. 288,869**

**Int. Cl. C05b *7/00***

**U.S. Cl. 252—1** **10 Claims**

Nitrogen- and phosphorus-containing compounds, containing in particular amido phosphates, can be prepared by a two stage process from liquid ammonia and solid phosphorus pentoxide. First a dispersion of solid phosphorus pentoxide in liquid ammonia is formed by adding the phosphorus pentoxide to liquid ammonia with agitation so as to keep local temperatures below 100° C. Secondly the reaction is, after completion of the addition of phosphorus pentoxide is complete, allowed to proceed at a temperature in the range 30–100° C. Typically the products have an N:P ratio in the range 2.4 to 2.6:1. They may be employed as animal feed supplements or plant growth regulants or as intermediates in the production of flame retardant chemicals.

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**3,788,987**

## SOLID LUBRICANT ADDITIVES DISPERSED IN PERFLUOROALKYL ETHERS WITH PERFLUOROALKYL ETHER ACID DISPERSANTS

**Philip Lee Bartlett, Wilmington, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.**

**No Drawing. Filed Sept. 30, 1970, Ser. No. 76,979**

**Int. Cl. C10m *3/02, 3/24***

**U.S. Cl. 252—25** **10 Claims**

Stable dispersions consisting essentially of from about 0.05 to about 10% by weight of a solid additive, from about 70 to 99.9% by weight of a polymeric hexafluoropropylene oxide fluid and from about 0.005 to about 20% by weight of a dispersing agent having the formula

$$R'_fO[CF(CF_3)CF_2O]_yCF(CF_3)COOH$$

wherein $R'_f$ is a perfluoroalkyl radical having from 1 to 6 carbon atoms and $y$ is from about 3 to about 40 and the process of preparing these dispersions by dispersing the solid additive in the hexafluoropropylene oxide fluid in the presence of the dispersing agent.

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**3,788,988**

## LUBRICANT COMPOSITIONS FOR THE COLD SHAPING OF METALS

**Jean Dubourg, Sotteville-les-Rouen, France, assignor to Rhone-Poulenc S.A., Paris, France**

**No Drawing. Filed Mar. 28, 1972, Ser. No. 238,953**

**Claims priority, application France, Mar. 29, 1971, 7110932**

**Int. Cl. C10m *1/36, 1/46***

**U.S. Cl. 252—32.5** **11 Claims**

A lubricating composition, suitable for cold working metals, comprise (i) an amide phosphate which is a reaction product of ortho-phosphoric acid or mono or diester thereof and an amide derived from an aliphatic carboxylic acid having at least 12 carbon atoms or a resin acid and a primary or secondary aliphatic amine and (ii) a surface active agent. The composition may be prepared in anhydrous form and emulsified in water prior to use or may be prepared as an aqueous emulsion.

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**3,788,989**

## MICROBIOCIDAL NAPHTHENYL IMIDAZOLINES

**Phillip Adams, Murray Hill, and Alfonso N. Petrocci, Glen Rock, N.J., assignors to Millmaster Onyx Corporation, New York, N.Y.**

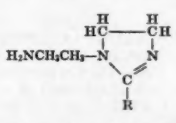
**No Drawing. Continuation-in-part of application Ser. No. 883,641, Dec. 9, 1969, now Patent No. 3,705,027. This application June 16, 1972, Ser. No. 263,682**

**The portion of the term of the patent subsequent to Dec. 5, 1989, has been disclaimed**

**Int. Cl. C10m *1/40***

**U.S. Cl. 252—33** **1 Claim**

A method of preserving metal-working fluids against microorganisms by adding the compound 1-aminoethyl-2-naphthenyl imidazoline, having the structure:



wherein R is the residue of naphthene-carboxylic acid as a microbiocidal preservative agent.

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**3,788,990**

## LUBRICATING COMPOSITIONS

**John Scotchford Elliott, Ian Robert Henry Crail, and Herbert Frank Askew, all of Burmah House, 57 Chiswell St., E.C. 1, London, England**

**No Drawing. Filed Dec. 28, 1971, Ser. No. 213,165**

**Claims priority, application Great Britain, Dec. 28, 1970, 61,619/70**

**Int. Cl. C10m *1/28, 1/40***

**U.S. Cl. 252—33.4** **8 Claims**

The compositions of the invention are lubricating oils comprising a major proportion of a mineral oil of lubricating viscosity and a minor proportion of a combination of additives (a) and (b), additive (a) being a nitrogen-free random copolymer of one or more alkyl meth-

acrylates and one or more alkyl acrylates, the copolymer being composed of up to 65% alkyl acrylate units based on the total number of alkyl methacrylate and alkyl acrylate units present in the copolymer and additive (b) being an alkaline earth metal containing detergent having a total base number greater than 40.

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**3,788,991**
**METAL WORKING AGENTS**

**Helmut Diery, Kelkheim, Taunus, Siegbert Rittner, Frankfurt am Main, and Horst Lorke, Oberliederbach, Taunus, Germany, assignors to Farbwerke Hoechst Aktiengesellschaft vormals Meister Lucius & Bruning, Frankfurt am Main, Germany**

**No Drawing. Filed Jan. 24, 1972, Ser. No. 220,489**
**Claims priority, application Germany, Jan. 26, 1971, P 21 03 419.5**
**Int. Cl. C10m *1/34***
**U.S. Cl. 252—33.6** **6 Claims**

The use of oil-free aqueous metal working agents, essentially consisting of water and

(A) 0.1 to 5.0% by weight of a water-soluble amine salt of an aryl-sulfonamido-alkylene-carboxylic acid, and
(B) 0.5 to 12.0% by weight of a water-soluble poly-addition product of ethylene oxide and propylene oxide and/or butylene oxide with a compound having 1 to 8 active hydrogen atoms

for cold rolling of iron sheet metal.

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**3,788,992**
**FUNCTIONAL FLUID COMPOSITIONS**

**James D. Sullivan, Chesterfield, Mo., assignor to Monsanto Company, St. Louis, Mo.**

**No Drawing. Continuation-in-part of application Ser. No. 796,885, Feb. 5, 1969, which is a continuation-in-part of application Ser. No. 540,488, Apr. 6, 1966, now abandoned. This application June 23, 1971, Ser. No. 156,135**
**Int. Cl. C10m *1/38, 1/32***
**U.S. Cl. 252—47.5** **4 Claims**

Functional fluid compositions which may be polyphenyl thioethers, mixed polyphenyl oxy-thioethers and mixtures thereof containing certain pyridine compounds which compositions have improved metal compatibility and are particularly useful as aircraft engine lubricants and hydraulic fluids.

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**3,788,993**
**LUBRICATING COMPOSITIONS**

**Harry J. Andress, Jr., Pitman, N.J., assignor to Mobil Oil Corporation**

**No Drawing. Continuation-in-part of application Ser. No. 222,642, Feb. 1, 1972. This application Apr. 24, 1972, Ser. No. 247,067**
**Int. Cl. C10m *1/32***
**U.S. Cl. 252—51.5 A** **10 Claims**

Hydrocarbon lubricant compositions are provided containing a minor proportion of the reaction product of at least one member of the group consisting of alkyl and alkenylsuccinic anhydrides and at least one member of the group consisting of benzotriazole and substituted benzotriazoles in a mole ratio of 1:1 to 1:2.

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**3,788,994**
**PRESSURE FIXABLE ELECTROSTATAGRAPHIC TONER**

**Russel E. Wellman, Pittsford, and Richard G. Crystal, Penfield, N.Y., assignors to Xerox Corporation, Stamford, Conn.**

**No Drawing. Filed Dec. 30, 1971, Ser. No. 214,374**
**Int. Cl. G03g *9/00***
**U.S. Cl. 252—62.1** **9 Claims**

Pressure and heat/pressure fixable encapsulated electrostatographic toners comprising adhesive, soft-solid core materials encapsulated in a polymeric shell material. Developer compositions employing the encapsulated toners and methods of forming visible electrostatographic toner images are also disclosed.

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**3,788,995**
**LIQUID ELECTROGRAPHIC DEVELOPERS**

**Frederick August Stahly and Stewart Henry Merrill, Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**No Drawing. Filed June 3, 1971, Ser. No. 149,851**
**Int. Cl. G03g *9/04***
**U.S. Cl. 252—62.1** **19 Claims**

Liquid developers for electrography are made using addition polymers containing a polar moiety and at least one additional moiety having predetermined solubility characteristics with respect to the carrier liquid. Mixtures of these polymers may also be used.

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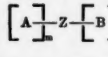
**3,788,996**
**COATING COMPOSITIONS CONTAINING POLYMERIC DISPERSING AIDS**

**Darrell R. Thompson, Somerville, N.J., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.**

**No Drawing. Continuation-in-part of application Ser. No. 39,535, May 21, 1970, which is a continuation-in-part of application Ser. No. 776,774, Nov. 18, 1968, both now abandoned. This application Apr. 12, 1971, Ser. No. 133,420**
**Int. Cl. H01f *1/28;* C09d *3/48***
**U.S. Cl. 252—62.54** **7 Claims**

A coating composition which comprises

(a) an organic liquid,
(b) a film forming polymer,
(c) particles dispersed in the liquid, and
(d) molecules of a linear polymeric material represented by the structure



where

A is an organic moiety bearing a multiplicity of the same or different functional groups adsorbed on the pigment particles;
*m* and *n* are 1, 2 or 3 (the total not exceeding 4);
Z is an organic linking radical; and
B is a polymeric segment of ethylenically unsaturated monomers, being extended into the organic liquid.

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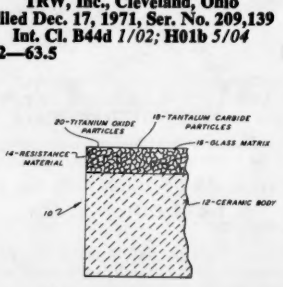
**3,788,997**
**RESISTANCE MATERIAL AND ELECTRICAL RESISTOR MADE THEREFROM**

**George D. MacKenzie, Maple Glen, Pa., assignor to TRW, Inc., Cleveland, Ohio**

**Filed Dec. 17, 1971, Ser. No. 209,139**
**Int. Cl. B44d *1/02;* H01b *5/04***
**U.S. Cl. 252—63.5** **8 Claims**




A resistance material including a mixture of a glass frit and finely divided particles of tantalum carbide and

titanium. The resistance material is adapted to be applied to and fired on a substrate to form an electrical resistor which will readily fuse or open when subjected to an overload to prevent excessive overheating of the resistor.

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**3,788,998**
**CHLORINATED DIELECTRIC LIQUIDS**
**Jean Coquillion, deceased, by Marie-Josephe Coquillion, St. Didier au Mont d'Or, executrix, and Pierre Jay, Decines, France, assignors to Progil, Paris, France**
**No Drawing. Continuation of abandoned application Ser. No. 855,388, Sept. 4, 1969. This application Dec. 13, 1971, Ser. No. 207,563**
**Claims priority, application France, Sept. 11, 1968, 50,376**
**Int. Cl. H01b *3/18, 3/24***
**U.S. Cl. 252—65** **12 Claims**

Dielectric liquids for use in impregnating capacitors are described which comprise a mixture of isopropylchlorodiphenyls and optionnally chlorodiphenyls containing at least 50% by weight of 2,4'-dichlorodiphenyl substituted at least in part with an isopropyl radical and wherein the number of isopropyl radicals is between 0.3 and 1.5 and the number of chlorine atoms is 2, both calculated on each mole of chlorodiphenyl compounds in the mixture. A scavenger such as an opoxide, or a low quantity of silicone oil or a nonpolar diluent may be added.

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**3,788,999**
**LONG-LIFE SUDSING BLEND AND PAD INCORPORATING SAME**
**Roger L. Abler, 3M Center, White Bear Lake, Minn. 55118**
**No Drawing. Continuation-in-part of abandoned application Ser. No. 18,712, Mar. 11, 1970. This application Dec. 14, 1972, Ser. No. 315,118**
**Int. Cl. C11d *17/04***
**U.S. Cl. 252—91** **6 Claims**

The useful life of a sudsing-type solid cleaning composition is increased by intimately blending it with certain proteinaceous hydrophilic colloidal agglutinants, especially gelatin or casein. The composition is advantageously incorporated in scouring pads of various types.

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**3,789,000**
**FORMULATING WITH A NON-BURNING CHLORINATED DRY BLEACH**
**Sidney Berkowitz, Highland Park, N.J., assignor to FMC Corporation, New York, N.Y.**
**No Drawing. Filed Aug. 4, 1972, Ser. No. 277,888**
**Int. Cl. C11d *7/54***
**U.S. Cl. 252—95** **9 Claims**

This invention provides a process that substantially reduces the precautions required when formulating dry bleaching, sterilizing, disinfecting and detergent compositions prepared by admixing a dry bleaching compound that yields active chlorine in water with an adjuvant for such compositions. This invention is based upon the surprising discovery that an organic dry bleaching compound, sodium dichloroisocyanurate dihydrate is non-burning.

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**3,789,001**
**DETERGENT CONTAINING ENZYME AND COARSE PERBORATE PARTICLES**
**Daniele Painelli, Rome, Italy, assignor to Colgate-Palmolive Company, New York, N.Y.**
**No Drawing. Filed Mar. 9, 1972, Ser. No. 233,311**
**Int. Cl. C11d *7/56***
**U.S. Cl. 252—99** **7 Claims**

Biological detergent composition containing a stable enzyme and a percompound, such as sodium perborate, the particles of which have a size such that at least about 50% of the particles are retained on a screen having sieve openings of 0.42 mm. and less than 5% of the particles pass through a screen having sieve openings of 0.177 mm.

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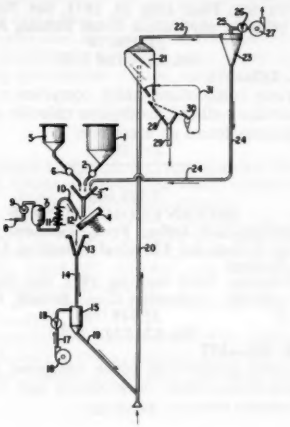
**3,789,002**
**SOLID, PULVERULENT TO GRANULAR COMPOSITIONS CONTAINING BLEACHING ACTIVATORS**
**Rudolf Weber, Dusseldorf-Holthausen, and Angelika Oppenoorth, Dusseldorf, Germany, assignors to Henkel & Cie GmbH, Dusseldorf, Germany**
**Filed Sept. 22, 1971, Ser. No. 182,748**
**Claims priority, application Germany, Oct. 1, 1970, P 20 48 331.2**
**Int. Cl. C11d *7/56***
**U.S. Cl. 252—99** **12 Claims**



Solid, pulverulent to granular compositions useful for the preparation of aqueous cold-bleaching baths, especially cold-bleaching washing liquors for textiles comprising (A) from 5% to 100% by weight of an activator component consisting of an activator for per-compounds in the form of particles surrounded with a coating substance inert to the activator, selected from the group consisting of water-soluble compounds and water-insoluble compounds, said activator constituting from 5% to 50%, preferably 15% to 40% by weight, and said coating substance constituting from 50% to 95%, preferably 60% to 85% by weight, of the activator component, and (B) from 0 to 95% by weight of other customary constituents of bleaching agents or washing compositions with bleaching action; as well as the method of producing the coated activator component.

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**3,789,003**
**SOLUBILIZING PROCESS**
**Frederic C. McCoy, Beacon, N.Y., assignor to Texaco Inc., New York, N.Y.**
**No Drawing. Continuation-in-part of application Ser. No. 787,567, Dec. 27, 1968. This application Aug. 25, 1971, Ser. No. 174,943**
**Int. Cl. C10m *1/28***
**U.S. Cl. 252—42.7** **8 Claims**

This invention concerns a process for converting normally oil-insoluble, high molecular weight poly (alkylene) oxides to oil-solubilized complexes by treatment with alkylated phenol-type compounds.

3,789,004
SOLVENT COMPOSITIONS
Ian McMillan and Jeffrey Prest, Runcorn, England, assignors to Imperial Chemical Industries Limited, London, England
No Drawing. Filed June 28, 1971, Ser. No. 157,735
Int. Cl. C11d 7/50
U.S. Cl. 252—171 2 Claims

A solvent composition which comprises a mixture of trichlorotrifluoroethane, ethanol and acetonitrile, which mixture forms an azeotrope.

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3,789,005
SOLVENT COMPOSITIONS
Ian McMillan and Jeffrey Prest, Runcorn, England, assignors to Imperial Chemical Industries Limited, London, England
No Drawing. Filed June 28, 1971, Ser. No. 157,738
Claims priority, application Great Britain, July 7, 1970, 32,950/70
Int. Cl. C11d 7/50
U.S. Cl. 252—171 2 Claims

A solvent composition which comprises a mixture of trichlorotrifluoroethane, methylene chloride and ethanol, which mixture forms an azeotrope.

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3,789,006
SOLVENT COMPOSITIONS
Ian McMillan and Jeffrey Prest, Runcorn, England, assignors to Imperial Chemical Industries Limited, London, England
No Drawing. Filed June 28, 1971, Ser. No. 157,737
Claims priority, application Great Britain, July 7, 1970, 32,949/70
Int. Cl. C11d 7/50
U.S. Cl. 252—171 3 Claims

A solvent composition which comprises a mixture of trichlorotrifluoroethane, isopropanol and nitromethane, which mixture forms an azeotrope.

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3,789,007
METHOD OF CLEANING
Peter Robinson, Runcorn, England, assignor to Imperial Chemical Industries Limited, London, England
No Drawing. Filed Aug. 3, 1971, Ser. No. 168,775
Claims priority, application Great Britain, Aug. 12, 1970, 38,870/70
Int. Cl. C11d 3/44
U.S. Cl. 252—171 5 Claims

A method for the removal of resists from printed circuit boards which comprises treating the board with a mixture comprising 85% to 97% by weight of methylene chloride and 15% to 3% by weight of methanol.

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3,789,008
COMPOSITION FOR MAINTAINING THE INTEGRITY OF AQUEOUS MEDIA
David W. Young, Homewood, Ill., assignor to Elco Chemicals Inc., Peotone, Ill.
No Drawing. Filed Aug. 27, 1971, Ser. No. 175,698
Int. Cl. C02b 5/06, 3/06
U.S. Cl. 252—180 5 Claims

There are disclosed compositions for maintaining the integrity of more or less stagnant water which compositions contain an aliphatic or cycloaliphatic dicarboxylic acid, a benzoic acid, a nitroalkanol, an alkyl dimethyl 1-naphthylmethyl ammonium chloride, and an N-acyl para-aminophenol. Preferred ingredients are adipic acid, benzoic acid, tris(hydroxymethyl)nitromethane, lauryldimethyl 1-naphthylmethyl ammonium chloride, and N-acetyl para-aminophenol. The compositions can be made in tablet form.

3,789,009
PROCESS FOR THE PREPARATION OF LARGE PARTICLE SILICA SOLS
Farhad A. Iran[illegible], Park Forest, Ill., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.
No Drawing. Filed July 15, 1971, Ser. No. 165,786
Int. Cl. B01j 13/00; C01b 33/14
U.S. Cl. 252—313 S 8 Claims

Large particle size aqueous silica sols having a substantially unimodal particle size distribution are prepared by adding simultaneously an alkali metal silicate and a cation exchange resin to a heel of water containing preformed colloidal silica particles at a pH within the range of 8–11, at a temperature of 60–150° C., and at a rate below that at which nucleation occurs. This process results in products having a concentration of 10–16% $SiO_2$, which can be further concentrated by evaporation to minimum turbidity sols containing 40% or more $SiO_2$.

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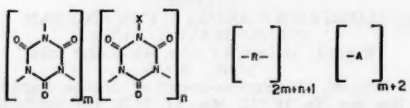
3,789,010
GEL COMPOSITION
C. Travis Presley, Littleton, Perry Argabright, Larkspur, and Ronald E. Smith, Littleton, Colo., assignors to Marathon Oil Company, Findlay, Ohio
Filed Aug. 23, 1971, Ser. No. 173,759
Int. Cl. B01j 13/00
U.S. Cl. 252—316 6 Claims



A gel composition sufficiently stable to support its own weight having elasticity and cohesive character produced by reacting at a pH above 7, an alkali metal hydroxide or alkaline earth metal hydroxide with a compound which contains polyisocyanurate salt groups, trisubstituted isocyanurate rings and end groups selected from: isocyanate, urethane, urea and amino groups, in the presence of hydroxyethyl cellulose.

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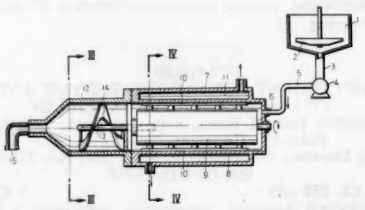
3,789,011
CONTINUOUS PROCESS FOR PRODUCING TRANSPARENT SOAP HAVING PEARLESCENT QUALITIES
Yoshio Tanaka, Tokyo, Japan, assignor to Ideal Soap Company, Tokyo, Japan
Filed July 1, 1971, Ser. No. 158,807
Claims priority, application Japan, Sept. 5, 1970, 45/77,598
Int. Cl. C11d 13/08, 13/16, 9/20
U.S. Cl. 252—367 1 Claim



A soap having pearl gloss is produced by cooling warm-fused transparent soap material containing pearl gloss de-

veloping material to a temperature range higher by at most 1.5° C. than a liquid-solid transition temperature region and pouring the cooled soap material into solidifying container while giving directional qualities to the pearl gloss material therein, and the apparatus for producing the soap is disclosed.

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3,789,012

**BRIGHTENING COMPOSITION CONTAINING A HYDROPHILIC COLLOID AND AN OIL-SOLUBLE VINYLENE BRIGHTENING AGENT**

**Robert J. Tuite, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**No Drawing. Original application Aug. 4, 1969, Ser. No. 847,404, now abandoned. Divided and this application Jan. 31, 1972, Ser. No. 222,305**

**Int. Cl. G03c** *1/92*

**U.S. Cl. 252—301.2 W** **16 Claims**

Hydrophilic colloids having intimately dispersed therein an essentially hydrophobic solid solution of an oil-soluble vinylene brightening agent in an essentially hydrophobic organic solvent that is rigid (an organic glass) at room temperature, i.e., has a glass transition temperature (Tg.) that is above about 25° C. are advantageously used in photographic elements and in image-receiving elements for image diffusion transfer because the light-stability of the stilbene brightening agents in these dispersions is increased substantially over the light-stability of the same brightening agents in dispersions outside the immediate invention.

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3,789,013

**PROCESS FOR PREPARING MULTI-COMPONENT NUCLEAR FUELS**

**Leonard V. Triggiani, Rockville, and Moises G. Sanchez, Severna Park, Md., assignors to W. R. Grace & Co., New York, N.Y.**

**No Drawing. Continuation-in-part of application Ser. No. 860,814, Sept. 24, 1969, which is a continuation-in-part of application Ser. No. 670,294, Sept. 25, 1967, now Patent No. 3,514,412. This application July 26, 1971, Ser. No. 166,301**

**The portion of the term of the patent subsequent to May 26, 1987, has been disclaimed**

**Int. Cl. C09r** *3/00*

**U.S. Cl. 252—301.1 S** **15 Claims**

A process for preparing urania-plutonia microspheres by impregnating a matrix of urania with a plutonium salt solution. The absorbed plutonium is precipitated in the pores of the urania microspheres with a suitable precipitant. The impregnated microspheres are then washed, dried and sintered to recover the mixed oxide microspheres.

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3,789,014

**YTTRIUM PHOSPHATE VANADATE PHOSPHOR**

**Eugene A. Graff, Cedar Grove, and Herman R. Heytmeijer, Whippany, N.J., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed June 14, 1972, Ser. No. 262,870**

**Int. Cl. C09k** *1/36, 1/44*

**U.S. Cl. 252—301.4 P** **7 Claims**

A method for improving the red luminescence and total luminescence of rare-earth metal activated yttrium phosphate vanadate phosphor using acid milling. The fired phosphor is milled in an acid solution. The use of acid during the milling provides an improved phosphor as compared to a water milling followed by the normal water or basic rinse, and even provides an improvement over water milling followed by an acid rinse. Preferably the acid used is either citric or hydrochloric. There is also provided the phosphor with the improved surface characteristics which is the product of this process.

3,789,015

**PROCESS FOR PRODUCING MICROCAPSULES CONTAINING OILY HYDROPHOBIC LIQUID**

**Hiroharu Matsukawa, Keiso Saeki, and Shizuo Katayama, Fujinomiya, Japan, assignors to Fuji Photo Film Co., Ltd., Ashigara-shi, Kanagawa, Japan**

**No Drawing. Filed July 2, 1971, Ser. No. 159,518**

**Claims priority, application Japan, July 2, 1970, 45/57,909**

**Int. Cl. B01j** *13/02;* **B44d** *1/02, 1/44*

**U.S. Cl. 252—316** **9 Claims**

The present invention relates to a process for producing microcapsules containing oily hydrophobic liquid. The process is characterized by adding a shock-preventing agent and a compound having at least one —COOX group at the repeating unit thereof, wherein X is hydrogen, alkali metal or ammonium, to the system at a temperature lower than the gelling point of gelatin in the hardening pretreatment of the complex coacervation utilizing gelatin as at least one of the hydrophilic colloids, whereby the elevation of viscosity due to the reaction of gelatin and an aldehyde hardening agent is prevented and the hardening pretreatment can be rapidly carried out.

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3,789,016

**HYDRODEHALOGENATION CATALYST**

**Lloyd E. Gardner, Bartlesville, Okla., assignor to Phillips Petroleum Company**

**No Drawing. Application July 28, 1969, Ser. No. 845,545, now Patent No. 3,636,173, which is a continuation-in-part of application Ser. No. 584,334, Oct. 5, 1966, now Patent No. 3,505,417. Divided and this application Aug. 6, 1971, Ser. No. 169,802**

**Int. Cl. B01j** *11/82*

**U.S. Cl. 252—437** **5 Claims**

Fluorohalocarbons are dehalogenated by contact in the presence of hydrogen with a catalytic composition containing aluminum fluoride and at least one metal phosphate.

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3,789,017

**OXIDATIVE DEHYDROGENATION CATALYSTS**

**Darrell W. Walker, Bartlesville, Okla., assignor to Phillips Petroleum Company**

**No Drawing. Filed May 6, 1971, Ser. No. 140,970**

**Int. Cl. B01j** *11/82*

**U.S. Cl. 252—437** **7 Claims**

Oxidative dehydrogenation catalyst comprising at least one metal selected from the group consisting of nickel, cobalt or iron in combination with tin, phosphorus, combined oxygen and, optionally, an alkali metal material, is substantially improved by impregnating such catalysts with additional tin.

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**ERRATUM**

For Class 252—439 see:
Patent No. 3,789,063

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3,789,018

**SURFACTANT IN PREPARING SOLID CATALYSIS**

**Leon B. Levy and George Cyrus Allen, Corpus Christi, Tex., assignors to Celanese Corporation, New York, N.Y.**

**No Drawing. Filed Aug. 30, 1971, Ser. No. 176,336**

**Int. Cl. B01j** *11/32*

**U.S. Cl. 252—439** **4 Claims**

The preparation of solid catalysts containing such additives as metal tellurides, useful in oxidation processes for olefin conversions, wherein said catalysts are prepared by methods which include dispersing solid catalyst components in a dispersing medium and removal of the

medium from the solids while they are being mixed or after mixing, is improved by the addition of a surface active agent in the mixture to promote blending and improve the resulting catalyst.

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3,789,019

## PREPARATION OF CATALYSTS USEFUL IN OXIDATION OF $SO_2$ GASES

**Alvin B. Stiles, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**No Drawing. Filed Dec. 27, 1971, Ser. No. 212,761**

**Int. Cl. B01j** *11/06, 11/22*

**U.S. Cl. 252—440** **35 Claims**

This invention relates to a process for preparing a catalytic material having high efficiency in the oxidation of $SO_2$ to $SO_3$ which entails preparing a homogeneous mixture comprising a catalytically effective amount of a primary catalytic material selected from the group of $CsVO_3$ or $RbVO_3$, a promoter, and a carrier material comprising diatomaceous earth; and then drying the mixture to provide the catalyst.

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3,789,020

## METHOD FOR PREPARATION OF CATALYSTS

**James L. Carter, Chatham, and John H. Sinfelt, Berkeley Heights, N.J., assignors to Esso Research and Engineering Company**

**No Drawing. Filed Feb. 1, 1971, Ser. No. 111,695**

**Int. Cl. B01j** *11/08, 11/22*

**U.S. Cl. 252—442** **20 Claims**

A method for the preparation of a catalyst comprising two or more metals in low concentration and one or more nonmetallic refractory materials in high concentration, which comprises supporting the metals on a fraction of the nonmetallic refractory material, and mixing said fraction with the remaining nonmetallic refractory material, whereby the overall catalyst at reaction conditions consists of a physical mixture of the supported metallic component and the remaining nonmetallic refractory material. More particularly, the supported metallic component is treated under reducing conditions to form an alloy of the metals on said fraction of the nonmetallic refractory material. In preferred embodiments the supported metallic component of the catalyst comprises two metals, one from Group VIII and one from Group I–B, or both from Group VIII.

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3,789,021

## CATALYST FOR THE PRODUCTION OF CYANURIC CHLORIDE

**Yelagondahally S. Suryanarayana and Luther J. Reid, Jr., Mobile, Ala., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

**No Drawing. Original application May 11, 1971, Ser. No. 142,358, now Patent No. 3,707,544. Divided and this application Oct. 16, 1972, Ser. No. 298,175**

**Int. Cl. B01j** *11/06*

**U.S. Cl. 252—446** **3 Claims**

An improvement is provided in a catalytic method for the production of cyanuric chloride from cyanogen chloride wherein the durability or life of the carbon catalyst is increased by mixing the active carbon catalyst with an intimate mixture of solid diluent, that is, an inert material or a catalyst with significantly less activity than the active carbon catalyst. Such a mixture when used in the vapor phase conversion of cyanogen chloride to cyanuric chloride has a much lower operating temperature with the result that the life of the active carbon catalyst is considerably increased.

3,789,022

## CATALYST FOR OXIDATION OF HYDROCARBONS AND CARBON MONOXIDE

**Barry A. Schenker, Warrensville Heights, Irving Malkin, University Heights, and Kirman Taylor, Painesville, Ohio, assignors to Diamond Shamrock Corporation, Cleveland, Ohio**

**No Drawing. Filed Aug. 19, 1971, Ser. No. 173,245**

**Int. Cl. B01j** *11/06*

**U.S. Cl. 252—462** **3 Claims**

An improved catalyst for oxidation of hydrocarbons and carbon monoxide is prepared by depositing on an alumina support layers of oxides of copper, cerium and chromium. Enhanced catalyst activity is obtained when cerium oxide is applied as the middle layer. Catalytic activity is further enhanced by applying the copper oxide layer first and maintaining the molar ratio of copper to chromium greater than one.

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3,789,023

## LIQUID DIFFUSION DOPANT SOURCE FOR SEMICONDUCTORS

**Kim Ritchie, Phoenix, Ariz., assignor to Motorola, Inc., Franklin Park, Ill.**

**No Drawing. Continuation-in-part of application Ser. No. 130,772, Apr. 2, 1971. This application Aug. 9, 1972, Ser. No. 278,896**

**Int. Cl. C09k** *3/00;* **H05b** *33/00;* **H01b** *1/06*

**U.S. Cl. 252—518** **8 Claims**

There is disclosed a liquid diffusion dopant source for semiconductor diffusions which comprises in combination 54–64% ethyl alcohol, 15–25% ethyl acetate, 7–17% tetraethylsilicate, 3–10% water and 0.1–10% of a doping atom source selected from the group consisting of the compounds of arsenic, phosphorus, boron, antimony, zinc, aluminum, platinum, gold and gallium. The liquid dopant source may be readily coated onto the semiconductor wafer either by painting, spraying or preferably spinning. After drying of the coating, diffusion of the dopant atoms into the wafer is readily conducted in a standard diffusion furnace.

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3,789,024

## REFORMING CATALYST

**John W. Myers, Bartlesville, Okla., assignor to Phillips Petroleum Company**

**No Drawing. Filed Oct. 18, 1971, Ser. No. 190,288**

**Int. Cl. B01j** *11/08*

**U.S. Cl. 252—466 PT** **3 Claims**

An improved catalyst comprising a refractory support and platinum promoted with both iridium and gallium, exhibiting increased activity and selectivity characteristics for the dehydrocyclization and reforming of hydrocarbons is provided. In one embodiment, alumina promoted with platinum, iridium, and gallium, converted n-heptane to benzene and toluene with substantial conversion at high selectivity.

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3,789,025

## CATALYST IMPREGNATION TECHNIQUE

**Samuel J. Tauster, Englishtown, N.J., assignor to Esso Research and Engineering Company**

**No Drawing. Filed Nov. 28, 1969, Ser. No. 880,951**

**Int. Cl. B01j** *11/06*

**U.S. Cl. 252—465** **8 Claims**

In a method of preparing a supported catalyst by contacting a hydrophilic porous solid catalyst support, such as alumina, with an aqueous solution of a soluble form of a metal catalyst compound to impregnate said support

therewith and thereafter calcining the impregnated catalyst support to produce a solid supported catalyst, the improvement comprising forming a slurry of the catalyst support material and an essentially water-immiscible liquid prior to contact with the aqueous solution and thereafter intimately mixing the slurry with the aqueous solution to form a liquid dispersion of the aqueous solution and water-immiscible liquid in contact with the solid catalyst support.

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**3,789,026**

## PROCESS FOR THE PRODUCTION OF REGENERATE

**Reinhold Baumann, Hausen, Ernst-Gunter Kunze and Robert Lauerbach-Lehmeier, Frankfurt am Main, Alfred Striebich, Bad Vilbel, and Hans-Joachim Rothe, Offenbach am Main, Germany, assignors to Zimmer Aktiengesellschaft, Frankfurt am Main, Germany**

**No Drawing. Filed Mar. 22, 1972, Ser. No. 237,174**

**Claims priority, application Germany, Mar. 24, 1971, P 21 14 304.4**

**Int. Cl. C08g** *53/22, 41/02, 39/00*

**U.S. Cl. 260—2.3** **12 Claims**

Regenerate produced from "wool," fiber, band and foil waste products from high polymer processes are processed to produce a material suitable for reintroduction into the high polymer process. The regenerate is produced by comminuting the waste and forming a fleece. The fleece is washed and dried and then condensed, preferably with a lubricant. The condensed product, after granulation, may be passed back to the high polymer process.

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**3,789,027**

## MICROPOROUS SHEET STRUCTURE

**Harro Träubel and Wolfgang Klebert, Leverkusen, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany**

**No Drawing. Continuation of application Ser. No. 86,591, Nov. 3, 1970. This application July 25, 1972, Ser. No. 274,952**

**Int. Cl. C08g** *22/44, 53/14*

**U.S. Cl. 260—2.5 AY** **2 Claims**

Permeable microporous sheet structure prepared by the reaction of monomeric isocyanates or isocyanate terminated prepolymers with polyamines in polyisocyanate nonsolvents and with subsequent removal of solvents and nonsolvents.

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**3,789,028**

## COATED FOAMABLE STYRENE POLYMER PARTICLES

**Elmar Heiskel, Langen, and Hartmut Last, Fischbach, Taunus, Germany, assignors to Farbwerke Hoechst Aktiengesellschaft vormals Meister Lucius & Bruning, Frankfurt am Main, Germany**

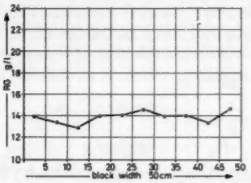
**Filed July 3, 1972, Ser. No. 268,831**

**Claims priority, application Germany, July 5, 1971, P 21 33 253.6**

**Int. Cl. C08j** *1/26*

**U.S. Cl. 260—2.5 B** **3 Claims**

Foamable particles of the styrene polymers and a volatile blowing agent and a lipophilic surface-active coating agent, wherein these particles contain, as a coating agent, from 0.05 to 0.5% by weight, calculated on the blowing agent containing styrene polymer, of mixtures of mono-, di- and tri-esters of glycerol with saturated fatty acids having from 12 to 22 carbon atoms, or mixtures thereof. These foamable particles offer an essential




shortening of the cooling time during foaming, a better bond of the foamed particles and a substantially uniform distribution of the gross unit weight in the finished foam block.

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**3,789,029**

## PLASTIC BONE COMPOSITION AND METHOD OF MAKING SAME

**Milton Hodosh, Providence, R.I., assignor to Research Corporation, New York, N.Y.**

**No Drawing. Continuation-in-part of application Ser. No. 60,983, July 6, 1970, which is a division of application Ser. No. 805,400, Mar. 10, 1969, now Patent No. 3,609,867. This application Oct. 4, 1971, Ser. No. 186,442**

**Int. Cl. C08f** *47/10, 45/04*

**U.S. Cl. 260—2.5 R** **6 Claims**

A plastic bone composition and method of making same, said composition comprising as its basic ingredients a mixture of an acrylic polymer, a foaming agent, N-tributyl phosphate, and grated anorganic bone. The mixture is usable for dental implants, as well as for implants in other parts of the body, and as a coating for metals which may be implanted in the human body for dental purposes, orthopedic prostheses, neurosurgery, etc.

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**3,789,030**

## REGULATION OF THE VISCOSITY INCREASE IN CHEMICALLY THICKENED UNSATURATED POLYESTER FORMULATIONS

**Frank P. Volgstadt, Painesville, and John R. Semancik, Mentor, Ohio, assignors to Diamond Shamrock Corporation, Cleveland, Ohio**

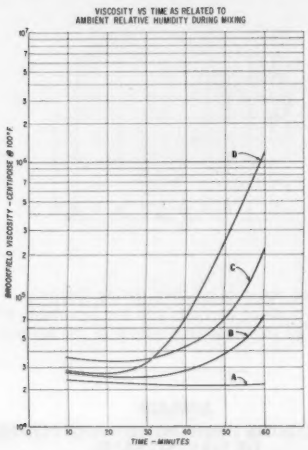
**Filed Apr. 5, 1972, Ser. No. 241,278**

**Int. Cl. C08f** *43/02*

**U.S. Cl. 260—29.6 NR** **13 Claims**

Unsaturated polyester compositions particularly for use in the preparation of bulk molding compound and sheet molding compound stocks which are chemically thickened prior to curing, by incorporation therein of from 0.5 part to 10 parts, per 100 parts of the resin system, of an oxide or hydroxide of a Group II-A metal, e.g., $Ca(OH)_2$ and MgO, additionally contain a minor quantity of a water-absorptive, but essentially water-insoluble compound which is, e.g., a synthetic zeolite, silica gel or calcium sulfate. Any of these materials serve to scavenge sufficient water in the formulation to keep its initial viscosity increase to a minimum and provide an extended work-life thereto. The aging viscosity build-up in the formulation surprisingly then

proceeds at a significantly accelerated rate so that thickening of the polyester to a desired high level can




be attained typically within 24 hours after its preparation.

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### 3,789,031

## COPOLYESTER FIBERS AND FILAMENTS HAVING DEFINED SHRINKING PROPERTIES

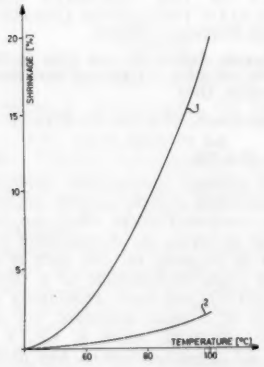
**Gert Buttner, Bobingen, Adolf Hartmann, Gessertshausen, and Peter Braun, Hofheim, Taunus, Germany, assignors to Farbwerke Hoechst Aktiengesellschaft vormals Meister Lucius & Bruning, Frankfurt am Main, Germany**

**Filed Oct. 30, 1970, Ser. No. 85,646**

**Claims priority, application Germany, May 14, 1970, P 20 23 527.2**

**Int. Cl. C08g *17/100***

**U.S. Cl. 260—75 T** **5 Claims**




Fibers and filaments having definite degrees of shrinkage in hot or boiling water and in the atmosphere of a hot gas are provided. The fibers and filaments consist of polyethylene terephthalate modified with 2,2-dimethyl-propanediol-1,3.

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### 3,789,032

## POLYURETHANE-POLYUREA ELASTOMERS BASED ON HIGH TRANS-TRANS, 4,4'-METHYLENEBIS-(CYCLOHEXYL ISOCYANATE)

**Guenther Kurt Hoeschele, Wilmington, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.**

**No Drawing. Filed June 22, 1971, Ser. No. 155,630**

**Int. Cl. C08g *22/24***

**U.S. Cl. 260—75 NT** **13 Claims**

Polyurethane/polyureas prepared by the process of reacting 4,4'-methylenebis(cyclohexyl isocyanate) containing at least 60% of the trans-trans isomer with a polyol and a polyamine in proportions such that there is an excess of isocyanato groups over hydroxy and amino groups and sufficient water is provided to react with the excess isocyanato groups. The polyurethane/polyureas, which have outstanding abrasion resistance, creep resistance, and compression set, are particularly useful in making cast elastomeric articles.

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### 3,789,033

## POLYURETHANES BASED ON ARYLOXY-CARBONYL ISOCYANATES

**Hermann Hagemann and Josef Pedain, both % Farbenfabriken Bayer Aktiengesellschaft, Leverkusen, Germany, and Erich Zankl, deceased, late of Cologne, Germany, by Helga Zankl and Walter Zankl, both of Amsterdamer Strasse 76, Cologne, Germany, and Angelika Zankl de Ramis, c/de las Parelladas, Palma de Mallorca, Spain, heirs**

**No Drawing. Filed Sept. 22, 1971, Ser. No. 182,902**

**Claims priority, application Germany, Oct. 3, 1970, P 20 48 658.2**

**Int. Cl. C08g *22/32, 51/26***

**U.S. Cl. 260—77.5 TB** **10 Claims**

Masked oxycarbonylisocyanates are prepared by reacting aryl oxycarbonylisocyanates with a compound containing at least two hydroxyl groups. When NCO and OH are present in equivalent amounts, the compounds are suitable as reactants with polymers containing hydroxyl groups for the production of, for example, lacquers. When the reaction is carried out such that OH groups are present in excess of that required to react with the available —NCO, the compounds, which are self cross-linking, are suitable for the production of, for example, cross-linked synthetic resins.

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### 3,789,034

## AZIRIDINE-DIISOCYANATE ADDUCT MODIFIED COMPOSITIONS

**Marco Wismer, Gibsonia, and Paul J. Prucnal, Monroeville, Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.**

**No Drawing. Filed Mar. 9, 1972, Ser. No. 233,301**

**Int. Cl. C08g *22/00***

**U.S. Cl. 260—77.5 AM** **39 Claims**

Reaction products of hydroxy acrylate or methacrylate monomers or hydroxyl bearing polymers and an aziridine-diisocyanate adduct. Coating compositions can readily be provided from such reaction products which are self-

curing and which can also be cured by employing a catalyst or with an active hydrogen containing crosslinking agent.

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### 3,789,035

## PROCESS FOR PRODUCING METAL-CONTAINING ETHYLENIC COPOLYMER

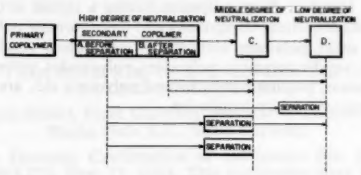
**Isamu Iwami, Tokyo, Hironobu Kawasaki, Yokohama, and Hideo Kinoshita, Kawasaki, Japan, assignors to Asahi-Dow Limited, Tokyo, Japan**

**Filed Oct. 10, 1972, Ser. No. 295,875**

**Claims priority, application Japan, Oct. 11, 1971, 46/79,503; Dec. 21, 1971, 46/103,217**

**Int. Cl. C08f *27/04***

**U.S. Cl. 260—78.5 T** **23 Claims**




A process for producing a metal-containing ethylenic copolymer having a degree of saponification of 30 to 100 mole percent and a degree of neutralization of 60 to 100 mole percent which comprises saponifying a primary copolymer of ethylene and at least one ester of $\alpha,\beta$-ethylenically unsaturated carboxylic acid having 4 to 10 carbon atoms, the unsaturated carboxylic ester content of said primary copolymer being 1 to 20 mole percent, with a basic metal compound in a solvent. A metal-containing copolymer having any desired degree of neutralization can be obtained from the aforesaid metal-containing ethylenic copolymer by contacting with an inorganic and/or organic acid to convert a part of the metal carboxylate groups in the copolymer into carboxyl groups. Alternatively, such a metal-containing ethylenic copolymer having any desired degree of neutralization can also be produced by melt-mixing those copolymers which have different degrees of neutralization. Further, any desired metal can be introduced into the alkali metal-containing copolymer by dispersing the copolymer in water and/or alcohol and adding thereto a compound having the desired non-alkali metal to effect ion-exchange.

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### 3,789,036

## PROCESS FOR PREPARING SATURATED AND UNSATURATED ELASTOMERIC COPOLYMERS OF ETHYLENE AND/OR HIGHER ALPHA-OLEFINS

**Paolo Longi, Nazzareno Cameli, Alberto Valvassori, Sandro Parodi, and Remo Cervi, Milan, Italy, assignors to Montecatini Edison S.p.A., Milan, Italy**

**No Drawing. Filed Oct. 12, 1971, Ser. No. 188,493**

**Claims priority, application Italy, Oct. 13, 1970, 30,912/70**

**Int. Cl. C08f *15/04, 15/40***

**U.S. Cl. 260—80.7** **8 Claims**

There is disclosed a process for copolymerizing ethylene and/or higher alpha-olefins to elastomeric saturated copolymers, or for copolymerizing at least one of ethylene and higher alpha-olefins with hydrocarbons containing more than one double bond to elastomeric unsaturated, sulfur-vulcanizable copolymers in very high yields. The catalyst used is obtained by mixing (a) a hydride or organometallic compound of a metal belonging to Groups I to III of the Mendelyeev Periodic Table with (b) the product obtained by contacting a titanium compound with a support consisting of an anhydrous halide of magnesium, manganese or calcium in an active condition.

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### 3,789,037

## THERMOSETTING COATING COMPOSITION OF AN ALKYD RESIN MIXTURE AND ALIPHATIC POLYISOCYANATE CROSS-LINKING AGENT

**Lester I. Miller, Flint, Mich., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.**

**No Drawing. Continuation-in-part of application Ser. No. 157,665, June 28, 1971. This application Dec. 10, 1971, Ser. No. 206,939**

**Int. Cl. C08g *39/10***

**U.S. Cl. 260—16** **4 Claims**

The coating composition of this invention contains as the film-forming binder an alkyd resin or a blend of alkyd resins and a polyisocyanate; this composition cures rapidly at ambient temperatures to a tough, durable, scratch resistant finish and is useful as an automotive and an appliance finish and as an automotive and truck repair finish.

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### 3,789,038

## PRODUCTION OF LOW MOLECULAR WEIGHT POLYANHYDRIDES AND EPOXY COMPOSITIONS DERIVED THEREFROM

**Omer E. Curtis, Jr., Morristown, Harold W. Tuller, Long Valley, and Ralph W. Nussbaum, Dover, N.J., assignors to Allied Chemical Corporation, New York, N.Y.**

**No Drawing. Original application Oct. 16, 1970, Ser. No. 81,616, now Patent No. 3,732,332. Divided and this application Mar. 26, 1973, Ser. No. 345,171**

**Int. Cl. C08g *51/18***

**U.S. Cl. 260—17.2** **7 Claims**

Polyanhydrides are produced by a novel bulk polymerization procedure from maleic monomers and alkyl styrenes. The polyanhydrides, of low molecular weight and containing maleic monomer to alkyl styrene in a ratio greater than 1 to 1, are particularly useful as hardeners for epoxy resin-containing compositions and give rise to epoxy compositions which result in cured products exhibiting high heat distortion temperatures and excellent electrical and shelf life properties.

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### 3,789,039

## CELLULOSE ACETATE BUTYRATE FILM-FORMING COMPOSITION CONTAINING TITANIUM DIOXIDE MICROVOIDS

**Dominic Simone, Lincroft, and Daniel F. Herman, Princeton, N.J., assignors to N L Industries, Inc., New York, N.Y.**

**No Drawing. Filed Dec. 27, 1971, Ser. No. 212,657**

**Int. Cl. C08b *21/06***

**U.S. Cl. 260—17 R** **2 Claims**

A new film forming and drying composition of matter has been prepared comprising an emulsion containing

thermoplastic polymeric resin, a solvent for said resin, an emulsifying agent and microdroplets of water containing $TiO_2$ pigment particles, said composition capable of forming microvoids of air upon drying. In the dried film the $TiO_2$ pigment particles are present in the microvoids in an amount of from 0.4% to 15% by volume of the total volume of the microvoids. The microvoids have a diameter of from 0.1$\mu$ to 1.0$\mu$ and a total microvoid volume of from 55% to 75% of the total volume of the dried film.

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3,789,040

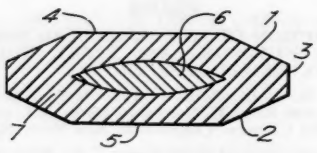
## PRODUCT FOR THE TREATMENT OF CELLULOSIC FABRICS TO IMPROVE CREASE RESISTANCE

**Eamon McKeown, Bromborough, John Leonard Metcalfe, West Kirby, and Arthur James Pratt, Bebington, England, assignors to Lever Brothers Company, New York, N.Y.**

**Continuation of abandoned application Ser. No. 818,318, Apr. 22, 1969. This application July 12, 1971, Ser. No. 162,005**

**Claims priority, application Great Britain, Apr. 26, 1968, 20,040/68**

**Int. Cl. C08b** *25/02*
**U.S. Cl. 260—17.3** **15 Claims**




A substantially anhydrous composition for treating cellulosic fabric to improve its crease-resistance comprises a water-soluble resin precondensate, a latent-acid catalyst and a basic or amphoteric metal compound. The composition preferably takes tablet form and has a core comprising the latent-acid catalyst and a sheath comprising the resin precondensate.

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3,789,041

## MELAMINE-FORMALDEHYDE RESINS CONTAINING CALCIUM CARBONATE

**Herbert Talsma, East Cleveland, Ohio, assignor to The Standard Oil Company, Cleveland, Ohio**

**No Drawing. Continuation-in-part of abandoned application Ser. No. 203,031, Nov. 29, 1971. This application Dec. 8, 1972, Ser. No. 313,545**

**Int. Cl. C08g** *51/18*
**U.S. Cl. 260—17.3** **5 Claims**

Melamine-formaldehyde resins containing 10 to 900 parts by weight of calcium carbonate per hundred parts of resin are excellent for use in preparing molded resin articles because of the lower post-mold shrinkage, the improved impact strength and the better heat stability than the resin without calcium carbonate.

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3,789,042

## RADIATION CURABLE DINORBORNENE COMPOSITIONS

**Henry Octave Colomb, Jr., and David John Trecker, South Charleston, and Thomas Kemper Brotherton, Charleston, W. Va., assignors to Union Carbide Corporation, New York, N.Y.**

**No Drawing. Original application Sept. 13, 1968, Ser. No. 759,759. Divided and this application May 26, 1971, Ser. No. 147,225**

**Int. Cl. B01j** *1/10, 1/12;* **C08d** *1/100*
**U.S. Cl. 260—17.4 CL** **19 Claims**

Dinorbornene compounds, many of them novel, have been found to form polymers having a ladder structure. The dinorbornene compounds and dinorbornene polymers with other polymers such as the polyolefins, vinyl polymers, acrylic polymers, polyesters, polyamides, polyethers, polyureas, polyurethanes, natural polymers, etc., are readily cross-linked by irradiation.

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3,789,043

## ELASTOMER STABILIZATION WITH LIGNIN-BASED MATERIALS

**Sten I. Falkehag, Mount Pleasant, and David V. Braddon, Charleston Heights, S.C., assignors to Westvaco Corporation, New York, N.Y.**

**No Drawing. Filed July 3, 1972, Ser. No. 268,593**

**Int. Cl. C08d** *9/02, 9/12*
**U.S. Cl. 260—17.5** **7 Claims**

Elastomers may be protected against atmospheric degradation by the addition thereto of 0.01 to 5.0 parts by weight, preferably 0.25 to 2.0 parts, per 100 parts of elastomer of a modified lignin stabilizer. The modified lignin stabilizers are produced by heat treating technical lignins in the presence of a nucleophile, such that a portion of the original guaicyl structures are converted to catechols via a demethylation reaction.

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3,789,044

## NOVEL CURED COMPOSITIONS PREPARED FROM THE REACTION OF A POLYISOCYANATE AND A HYDROXYBENZOIC ACID CAPPED EPOXIDE-CONTAINING MATERIAL

**David D. Taft, Minneapolis, and Roger A. Schmidt, Burnsville, Minn., assignors to Ashland Oil, Inc., Houston, Tex.**

**No Drawing. Filed Jan. 26, 1971, Ser. No. 109,986**

**Int. Cl. C08g** *5/00*
**U.S. Cl. 260—18 TN** **16 Claims**

A novel composition is prepared by combining a polyisocyanate and a hydroxybenzoic acid capped epoxide-containing material. This combination of ingredients can be rapidly cured at room temperature to essentially its ultimate state of use by contacting the combination with a tertiary amine to yield a durable, flexible, and caustic resistant material.

3,789,045

## REACTION OF POLYISOCYANATES WITH COMPOUNDS CONTAINING BLOCKED AMINE GROUPS IN THE PRESENCE OF ACIDS OR METAL SALTS OF ACIDS

Arthur J. Coury, St. Paul, Edgar R. Rogier, Minnetonka, and Gerald L. Schwebke and Douglas D. Cozad, Minneapolis, Minn., assignors to General Mills Chemicals, Inc.

No Drawing. Filed Nov. 13, 1972, Ser. No. 306,071

Int. Cl. C08g 22/02

U.S. Cl. 260—18 TN 15 Claims

Polymers are prepared by the reaction of polyisocyanates and certain polyamine derivatives in the presence of an organic acid, a salt of an organic acid or a mineral acid. The latter compounds accelerate the reaction even in the absence of moisture normally used to unblock the ketimine or aldimine groups of the polyamine derivative.

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3,789,046

## AQUEOUS AIR- AND OVEN-DRYING COATING COMPOSITIONS

Klaus Heidel, Marl, Germany, assignor to Chemische Werke Huls A.G., Marl, Germany

No Drawing. Continuation of application Ser. No. 884,374, Dec. 11, 1969. This application May 12, 1972, Ser. No. 252,939

Claims priority, application Germany, Dec. 17, 1968, P 18 15 014.6

Int. Cl. C08c 11/72; C08d 9/17

U.S. Cl. 260—23.7 A 14 Claims

Aqueous based coating compositions having good water resistance are produced from ammonia- or amine-neutralized adducts of maleic anhydride and like dicarboxylic acids and anhydrides and butadiene homopolymers having at least 50% cis 1,4-structure and a viscosity of 30–30,000 cps. at 50° C., preferably combined with a maleic anhydride or like adduct of a natural drying or semidrying oil.

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3,789,047

## ETHYLENE COPOLYMER DISPERSIONS FOR FLAME RETARDATION AND FIBROUS ARTICLES COATED THEREWITH

Gerfried Pruckmayr, Media, Pa., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

No Drawing. Continuation-in-part of application Ser. No. 176,303, Aug. 30, 1971, which is a continuation of application Ser. No. 827,175, May 23, 1969, now abandoned. This application Oct. 25, 1972, Ser. No. 300,812

Claims priority, application Canada, May 21, 1970, 83,383

Int. Cl. C08f 45/30

U.S. Cl. 260—28.5 R 2 Claims

An aqueous dispersion of an ethylene copolymer, a chlorinated paraffin wax and antimony trioxide is provided. The dispersion contains (1) about 70 to 15 percent by weight of an ethylene/vinyl acetate copolymer or an ethylene/methacrylic acid ionomer copolymer, (2) about 30 to 85 percent by weight of a chlorinated paraffin wax having greater than 50 percent by weight chlorine, the total chlorine content of (1) and (2) being 20 to 60 percent by weight, and (3) antimony trioxide in a ratio of antimony trioxide to chlorinated paraffin wax of 0.25:1 to 3:1. Fibrous materials such as fiberfills or textile fabrics are rendered flame retardant when coated with the dispersions.

3,789,048

## OLIGOMER POLYIMIDE PRECURSORS

Joseph H. Incremona, Bethel Park, Pa., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

No Drawing. Continuation-in-part of abandoned application Ser. No. 92,540, Nov. 24, 1970. This application Nov. 2, 1971, Ser. No. 195,022

Int. Cl. C08g 20/32

U.S. Cl. 260—30.2 9 Claims

Polyimides highly soluble in N-methyl pyrrolidone are provided. These are preferably derived from polyimide precursor systems consisting essentially of the nonfilm-forming reaction product of (a) the incomplete reaction product of bis-(3,4-dicarboxyphenyl) sulfone dianhydride and a capping agent, and (b) diamine including metaphenylene diamine.

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3,789,049

## GLASS FIBER-REINFORCED EPOXY RESIN OR POLYESTER RESIN COMPOSITION AND METHOD FOR MANUFACTURING SAME

Takeshi Nagasawa, Katsumasa Kuroiwa, and Koulchi Narita, Koriyama, Japan, assignors to Nitto Boseki Co., Ltd., Gonome, Fukushima-shi, Japan

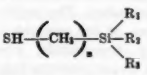
Filed Dec. 20, 1971, Ser. No. 209,571

Claims priority, application Japan, Dec. 23, 1970, 45/129,041

Int. Cl. C08g 51/10

U.S. Cl. 260—40 R 8 Claims

A glass fiber-reinforced, epoxy resin or unsaturated polyester resin composition comprising glass fiber, an epoxy resin or an unsaturated polyester resin, and, at the interface of said glass fiber and resin, a reaction product of a partially epoxidized polybutadiene having at least about 50 mole percent of 1,2-structure with a mercaptoorganosilane of the formula,



wherein $R_1$, $R_2$ and $R_3$, which may be the same or different, represent hydrolyzable radicals capable of reacting with glass fiber, for example, alkoxy groups having 1 to 3 carbon atoms, acetoxy groups or halogen atoms, and $n$ is an integer of from 1 to 4. By the presence of said reaction product at the interface, the adhesion between the glass fiber and the resin is improved and there is obtained a reinforced plastic having a high strength and excellent transparency.

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3,789,050

## PROCESS AND COMPOSITIONS OF RUBBER VULCANIZATES WITH SILICONE POLYMERIZATES

Domingos Loricchio, Sao Paulo, Brazil, assignor to The Carborundum Company, Niagara Falls, N.Y.

No Drawing. Filed Apr. 20, 1971, Ser. No. 135,764

Int. Cl. C08c 11/08

U.S. Cl. 260—41.5 R 13 Claims

A process for making improved compositions of rubber vulcanizates, simultaneously polymerized with silicones to give improved abrasion resistant bodies containing powders or granules of abrasive inorganic materials. The bodies are formed under pressure of about 2 kg./cm.$^2$ and temperatures of 100–180° C.

3,789,051

## REINFORCED RESIN COMPOSITIONS

Richard Watkin Rees, Wilmington, and Hans-Georg Reinhardt, Claymont, both of Del., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Sept. 23, 1971, Ser. No. 183,281
Int. Cl. C08f 45/04, 45/10
U.S. Cl. 260—41 A 16 Claims

A reinforced resin composition comprising A) 20 to 60 percent by weight syrup comprising (1) 40 to 70 percent by weight vinyl substituted aromatic compound containing six aromatic carbon atoms and/or monofunctional ethylenically unsaturated carboxylic acid ester; (2) 10 to 40 percent by weight of an acid monomer system comprising ethylenically unsaturated carboxylic acid; (3) 15 to 35 percent by weight of polymer of vinyl or vinylidene substituted aromatic compound containing six aromatic carbon atoms and/or acrylic polymers; (4) 0.2 to 2.5 percent by weight polymerization catalyst; B) 20 to 60 percent by weight particulate filler; C) 5 to 60 percent by weight fibrous material and D) 1 to 6 equivalents of hydroxides and/or oxides of the Group IIA and IIB metals per equivalent of the ethylenically unsaturated carboxylic acid in the acid monomer system.

3,789,052

## IMIDO-ALKYLENE SUBSTITUTED AROMATIC CARBOCYCLIC POLYMERS

Johann F. Klebe, and Thomas J. Windish, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 846,623, July 1, 1969, abandoned. This application Apr. 30, 1971, Ser. No. 139,208
Int. Cl. C08g 20/00
U.S. Cl. 260—47 CZ 8 Claims

A variety of imido-alkylene substituted aromatic carbocyclic organic polymers are provided, such as polymers having chemically combined aromatic carbocylic radicals in the polymer backbone, for example, polyarylene oxides, and polymers having pendant aromatic carbocyclic radicals, such as polystyrenes. Blends of such polymers with various aliphatically unsaturated organic monomers and a variety of organic polymers also are included. The imido-substituted aromatic carbocyclic polymers of the present invention can be employed as molding compounds, photoresists, laminates, varnishes, adhesives, decorative coatings, etc.

3,789,053

## OXAZOLIDINONE MODIFIED TRIGLYCIDYL ETHER OF TRIHYDROXY TRIPHENYL METHANE AND DERIVATIVES THEREOF

James A. Clarke, Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Filed Aug. 19, 1971, Ser. No. 173,258
Int. Cl. C08g 30/14
U.S. Cl. 260—47 EN 3 Claims

Novel oxazolidinone modified triglycidyl ethers of trihydroxy triphenyl methane and derivatives thereof are prepared which are useful in molding and adhesive compositions.

3,789,054

## PROCESS FOR PRODUCING POLYPHENYLENE ETHERS

Shinichi Izawa, Tokyo; Kunio Toyama, Kanagawa; Yoshiaki Sugawara, Kanagawa; Tsutomu Tanaka, Kanagawa, and Hidehiro Okamoto, Kanagawa, all of Japan, assignors to Asahi-Dow Limited, Tokyo, Japan

Filed Dec. 6, 1971, Ser. No. 205,375
Claims priority, application Japan, Dec. 8, 1970, 45-108107
Int. Cl. C08g 23/18
U.S. Cl. 260—47 ET 10 Claims

Polyphenylene ethers of 5 microns or more in particle size which are useful for preparation of parts of electric devices are continuously produced according to oxidative polymerization of 2,6-disubstituted phenols by preparing a 15 to 35 % (by weight) solution of 2,6-disubstituted phenol in dimethylformamide or in a mixed solvent composed of toluene and methanol, subjecting the solution to polymerization in one zone while maintaining the reaction system in the state of a homogeneous solution, and transferring the polymerization liquid to another zone to complete the polymerization while allowing the resulting polymer to precipitate.

3,789,055

## ALIPHATICALLY UNSATURATED IMIDES AND METHOD FOR MAKING SAME

Johann F. Klebe; Henry A. Wroblewski, and Alfred R. Gilbert, all of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Dec. 31, 1970, Ser. No. 103,303
Int. Cl. C08g 5/18, 20/28
U.S. Cl. 260—51 R 23 Claims

A method is provided for introducing aliphatically unsaturated imidomethyl radicals into a variety of aromatic organic compounds and aromatic organic materials derived therefrom. Imidomethylation is achieved with a mixture of formaldehyde, and an aliphatically unsaturated imide such as maleimide. The resulting imidomethyl substituted aromatic organic materials can be used as molding and laminating compounds.

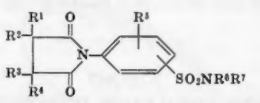
3,789,056

## A-PHENYLSUCCINIMIDO-HALO-SULPHONAMIDO-BENZENES

Rolf Wilhelm Pfirrmann, Lucerne, Switzerland, assignor to Ed Geistlich Sohne A.G. fur Chemische Industrie, Wolhusen, Lucerne, Switzerland

Filed June 17, 1970, Ser. No. 47,161
Claims priority, application Great Britain, June 18, 1969, 30915/69
Int. Cl. C07d 27/10; A61k 27/00
U.S. Cl. 260—239.6 4 Claims

This invention relates to novel compounds of the formula



where $R^1$ through $R^7$ are as hereinafter defined, of use in the treatment of Petit Mal and Grand Mal forms of epilepsy.

3,789,057

## A PROCESS FOR PREPARING SYMETRICAL TRIORGANOTIN HALIDES

Gerald H. Reifenberg, Hightstown, and Melvin H. Gitlitz, Edison, both of N.J., assignors to M & T Chemicals Inc., Greenwich, Conn.

Continuation-in-part of Ser. No. 816,783, April 19, 1969, Pat. No. 3,607,891, which is a continuation-in-part of Ser. No. 773,331, Nov. 4, 1968, Pat. No. 3,564,033. This application Apr. 14, 1971, Ser. No. 134,045
Int. Cl. C07f 7/22
U.S. Cl. 260—429.7 7 Claims

Novel organotin compounds of the formula $R_nR'_{(3-n)}SnX$ are prepared by reacting equimolar amounts of $R_{(n+1)}R'_{3-n}Sn$ and a stannic halide in an inert hydrocarbon solvent at temperatures between about -25° and 80° C. R represents a monovalent linear aliphatic hydrocarbon radical containing up to six carbon atoms, R′ represents a monovalent aliphatic or cycloaliphatic hydrocarbon radical containing up to eight carbon atoms, with the proviso that the molecular weight of R′ exceeds that of R by at least 42 except when R′ is a

cycloaliphatic hydrocarbon radical. X represents a chlorine or bromine atom and *n* represents an integer selected from the group consisting of 1 and 2.

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3,789,058

## METHOD OF EXTRACTING WAX FROM BARK

Frank S. Trocino, 5070 Donald, Eugene, Oreg.

Filed Mar. 8, 1972, Ser. No. 232,944
Int. Cl. C11b *1/12*
U.S. Cl. 260—412.8 5 Claims

Douglas fir bark is extracted with a hot neutral organic solvent comprising a mixture of an aliphatic and an aromatic hydrocarbon to separate the wax from the bark. The solvent is thereafter removed from the wax to yield a light to dark green wax having a melting point of 60° C., a saponification number of 180–200, an acid number of 50–75 and a hardness of 3–4.

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3,789,059

## METHOD OF PRODUCING HIGH PURITY LITHIUM CHLORIDE

Ephraim A. Cuevas, Corpus Christi, Tex., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Continuation of Ser. No. 54,408, July 13, 1970, abandoned. This application Mar. 31, 1972, Ser. No. 240,087
Int. Cl. C07f *7/24*
U.S. Cl. 260—437 R 16 Claims

A method of producing high purity lithium chloride suitable for use in the manufacture of high purity lithium metal is described. Lithium chloride produced in accordance with the described method is recovered from aqueous solutions of lithium chloride produced in the manufacture of tetraalkylleed from metallic lithium, metallic lead and alkyl halides. The specification describes a lithium chloride evaporation system in which the lead concentration of the evaporator is maintained at a level of 0.3 percent by weight lead or less to produce high purity lithium chloride crystals. Maintenance of the lead concentration during the evaporation of the lithium-chloride solution at this level produces a lithium chloride crystal containing 99 percent by weight lithium chloride or more. These crystals are found to contain less than 100 parts per million lead. Two specific methods for controlling the concentration of the lead in the evaporator are shown; one involving the precipitation of lead hydroxy chloride [Pb(OH)Cl] from the circulating solutions and the other providing for a hydrogen sulfide treatment of evaporator bleed streams to maintain the lead level constantly below the 0.3 percent weight level.

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3,789,060

## FLUORINATED CAMPHOR DERIVATIVES AND EUROPIUM AND PRASEODYMIUM CHELATES THEREOF

Harlan L. Goering; John N. Eikenberry, and Gerald S. Koermer, all of Madison, Wis., assignors to Wisconsin Alumni Research Foundation, Madison, Wis.

Filed Nov. 3, 1971, Ser. No. 195,429
Int. Cl. C01f *17/00*
U.S. Cl. 260—429.2 6 Claims

Optically active fluorinated compounds derived from d- or l-camphor and their corresponding europium and praseodymium chelates and their use as chiral NMR shift reagents.

3,789,061

## FUNGICIDAL AND FUNGISTATIC THIOCARBONATES

Georg-Alexander Hoyer, and Ernst Albrecht Pieroh, both of Berlin, Germany, assignors to Schering AG., Berlin and Bergkamen, Germany

Filed Mar. 31, 1970, Ser. No. 24,375
Claims priority, application Germany, Apr. 24, 1969, 1921988
Int. Cl. C07c *154/00*
U.S. Cl. 260—455 B 1 Claim

Novel thiocarbonates of the formula

$$(CH_3)_2\,N—(CH_2)_3—O—CO—S—R$$

wherein R is the radical of an aliphatic hydrocarbon, and their salts with inorganic or organic acids are provided having fungicidal and fungistatic effects and the method of making the same.

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3,789,062

## LIGANDS WHICH ARE ALSO SILVER HALIDE DEVELOPING AGENTS

Elbert M. Idelson, Newton Falls, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Continuation-in-part of Ser. No. 881,323, Dec. 1, 1969, Pat. No. 3,629,336, Continuation-in-part of Ser. No. 487,054, Sept. 13, 1965, abandoned. This application Dec. 29, 1970, Ser. No. 102,563. The portion of the term of this patent subsequent to Dec. 21, 1988, has been disclaimed.
Int. Cl. C07c *49/82*; G03c *1/02*
U.S. Cl. 260—463 10 Claims

Novel compounds or coordinating agents which can form a coordination complex with a metal and which include an ortho or para disubstituted phenyl radical. The compounds are useful as intermediates for providing colored dyes.

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3,789,063

## OLEFIN OXIDATION CATALYST

Robert E. Lane, Jr., Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Filed May 8, 1972, Ser. No. 251,189
Int. Cl. B01j *11/74*
U.S. Cl. 252—439 8 Claims

The vapor phase oxidation of isobutene to methacrolein or methacrylonitrile (when $NH_3$ is used as a reactant) is improved when an oxide of Na, K, Rb, Cs or Ca is added as a promoter to a catalyst containing the oxides of iron, molybdenum, tellurium and at least one of the oxides of rhenium, manganese and vanadium.

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3,789,064

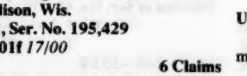
## SULFUR-CONTAINING ESTERS OF SUBSTITUTED HYDROXYPHENYL ALKANOIC ACIDS

Ingenuin A. Hechenbleikner, Kenwood; John F. Hussar, Loveland; Arthur F. Koeniger, Cincinnati, and Robert E. Bresser, Sharonville, all of Ohio, assignors to Cincinnati Milacron Chemicals Inc., Reading, Ohio

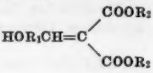
Division of Ser. No. 884,016, Dec. 10, 1969, Pat. No. 3,699,152. This application Mar. 14, 1972, Ser. No. 234,649. The portion of the term of this patent subsequent to Oct. 2, 1990, has been disclaimed.
Int. Cl. C07c *65/04*
U.S. Cl. 260—473 S 2 Claims

Compounds are prepared having one of the following formulae:

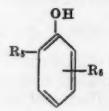
a. $HOR_1CH_2S(CH_2)_nCOOR_4$

(b) 

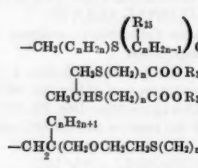
c. $HOR_1C_mH_{2m-1}(S(CH_2)_nCOOR_3)_2$
d. $(HOR_1CH_2)_2C(COOR_3)_2$
e. $HOR_1CH_2O(CH_2)_nCOOR_2$
f. $HOR_1CH_2OCH_2CH_2OOCCH_2CH_2S(CH_2)_nCOOR_3$
g. $HOR_1CH_2CH(COOR_2)_2$
(h)



where $HOR_1$ is



where $R_5$ and $R_6$ are hydrogen, alkyl, cycloaklyl, aryl or aralkyl, the total carbon atoms in $R_5$ and $R_6$ is between four and 36 carbon atoms, is preferably not over 12 carbon atoms and $R_6$ is preferably in the ortho position, $R_2$ is



$R_3$ is hydrocarbyl, preferably alkyl or alkenyl, e.g., of one to 18 carbon atoms, $n$ is 1 or 2, $R_{14}$ is H or $COOR_2$, $m$ is 1, 2, 3 or 4, $y$ is 0 or 1, and $R_4$ is either $R_2$ or $R_3$ and $R_{15}$ is hydrogen or lower alkyl. The above compounds are useful as antioxidants.

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**3,789,065**

## PROCESS FOR PREPARING VICINAL GLYCOL ESTERS FROM OLEFINS

**John Kollar, Wyckoff, N.J., assignor to Halcon International, Inc., New York, N.Y.**

**Continuation-in-part of Ser. No. 16,258, March 3, 1970, abandoned. This application Oct. 7, 1971, Ser. No. 187,552**
**Int. Cl. C07c** *67/04, 69/16, 69/28*
**U.S. Cl. 210—497 R** **13 Claims**

In the process for preparation of vicinal glycol esters from an olefin by reacting the olefin in the liquid phase with molecular oxygen and a carboxylic acid in the presence of a catalyst within an oxidation zone, selectivities to the desired glycol esters are improved by treating the high-boiling residue and the precursor light components separated from the oxidation effluent by contacting them with a carboxylic acid. In a preferred embodiment both residue and precursor light components are recycled to the oxidation zone where they are converted to additional glycol ester product.

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**3,789,066**

## PROCESS FOR PRODUCING ACYLOXYDODECATRIENES

**Saburo Hattori, Tokyo, and Naoshi Imaki, Kawasaki, both of Japan, assignors to Mitsubishi Chemical Industries, Ltd., Marunouchi, Cheyoda-ku, Tokyo, Japan**

**Filed Dec. 27, 1971, Ser. No. 212,748**
**Claims priority, application Japan, Dec. 30, 1970, 45-125874; Mar. 29, 1971, 46-18561**
**Int. Cl. C07c** *67/04*
**U.S. Cl. 260—497 A** **10 Claims**

Acyloxydodecatriene is produced by reacting an octatriene, a butadiene and a carboxylic acid in the presence of a catalytic amount of a divalent palladium compound selected from the group consisting of organic acid salts of palladium (II), chelate complexes of palladium (II) and palladium nitrate.

**3,789,067**

## METHOD OF INHIBITING SULFONE FORMATION IN SULFONATIONS

**Michael Robin, Colonia, and Sheldon R. Schulte, Highland Park, both of N.J., assignors to Ashland Oil Inc., Houston, Tex.**

**Filed Feb. 13, 1970, Ser. No. 11,296**
**Int. Cl. C07c** *143/24*
**U.S. Cl. 260—505 E** **14 Claims**

Process for sulfonating a sulfonatable material with sulfur trioxide using an inorganic sulfite to inhibit sulfone formation.

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**3,789,068**

## AMINOETHANESULFONIC ACID DERIVATIVE

**Shoichi Ito, Tokyo; Mikio Ninomiya, Kanagawa, and Hidekuni Uchida, Saitama, all of Japan, assignors to Taisho Pharmaceutical Co., Ltd., Tokyo, Japan**

**Filed Dec. 7, 1970, Ser. No. 95,932**
**Claims priority, application Japan, Dec. 6, 1969, 44-98059**
**Int. Cl. C07c** *143/54*
**U.S. Cl. 260—507 R** **2 Claims**

2-($\alpha$-(p-Chlorophenoxy)-isobutyryl)-aminoethanesulfonic acid and the salts thereof, which possess valuable pharmacological and therapeutic properties, and the pharmaceutical compositions containing the same.

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**3,789,069**

## NOVEL MULTIFUNCTIONAL HYDROXY COMPOUNDS

**Clarence R. Bresson, and Raymond L. Cobb, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.**

**Division of Ser. No. 749,990, Aug. 5, 1968, Pat. No. 3,609,189, which is a division of Ser. No. 492,892, Oct. 4, 1965, Pat. No. 3,414,617. This application Apr. 22, 1971, Ser. No. 136,603**
**Int. Cl. C07c** *149/24, 149/26, 149/42*
**U.S. Cl. 260—514 J** **13 Claims**

N-alkylated derivatives of 2-amino-2-hydrocarbylthiomethyl-1,3-propanediols useful as flotation agents, rubber modifiers, and chelating agents in the separation of metals are produced by reacting 2-amino-2-hydrocarbylthiomethyl-1,3-propanediols with organic halides. Thiols can be produced by reacting arylmethylated or alkarylmethylated derivatives of the above compounds with an alkali metal in the presence of ammonia.

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**3,789,070**

## PROPHYLAXIS AND TREATMENT OF CARDIAC 3,4,5-TRIALKOXYPHENYLALKANOIC ACIDS AND SALTS THEREOF

**Garzia Aldo, Lodi, Italy, assignor to Istituto Chemioterapico Italiano S.p.A., Milan, Italy**

**Filed June 26, 1970, Ser. No. 50,327**
**Int. Cl. C07c** *65/02*
**U.S. Cl. 260—521 R** **6 Claims**

(3,4,5-trialkoxy phenyl) alkanoic acids and their pharmaceutically-acceptable salts for prophylaxis and treatment of cardiac disorders.

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**3,789,071**

## EPOXY CURING AGENT

**Eduard P. Babayan, Inglewood, Calif., assignor to Hitco, Irvine, Calif.**

**Division of Ser. No. 48,538, June 22, 1970,. This application Oct. 7, 1971, Ser. No. 187,529**
**Int. Cl. C07c** *127/12*
**U.S. Cl. 260—553 R** **2 Claims**

An improved curing agent for epoxy resin compositions containing a polyepoxide comprising a substituted diurea formed by the reaction of two mols of a secondary amine,

preferably an aliphatic amine, such as dimethylamine with one mol of a diisocyanate containing one cycloaliphatic isocyanate group and one aliphatic isocyanate group such as isophorone diisocyanate. The curing temperature of the composition can be substantially increased to provide products having improved properties without the danger of undercuring or substantial shortening of the gel time.

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**3,789,072**

## CARBOXAMIDES

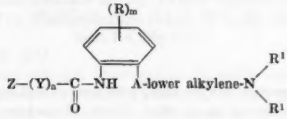
**Jack Bernstein, New Brunswick, N.J., assignor to E. R. Squibb & Sons, Inc., New York, N.Y.**

**Continuation-in-part of Ser. No. 670,795, Sept. 26, 1967, abandoned, which is a continuation-in-part of Ser. No. 464,226, June 15, 1965, abandoned. This application Apr. 22, 1970, Ser. No. 30,989**

**Int. Cl. C07c** *103/30*

**U.S. Cl. 260—557 B** **11 Claims**

This invention relates to new compounds of the formula



and acid addition and quaternary ammonium salts thereof, substances which have serotonin inhibitory, hypotensive and analgesic activities.

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**3,789,073**

## ADAMANTYLALKYLAMINOALKYL BENZAMIDES

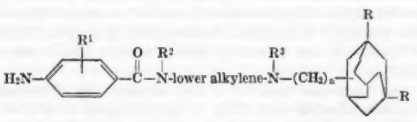
**Venkatachala L. Narayanan, North Brunswick, and Jack Bernstein, New Brunswick, both of N.J., assignors to G. R. Squibb & Sons, Inc., New York, N.Y.**

**Continuation-in-part of Ser. No. 670,765, Sept. 26, 1967, abandoned, which is a continuation-in-part of Ser. No. 571,399, Aug. 10, 1966, abandoned. This application Apr. 22, 1970, Ser. No. 30,976**

**Int. Cl. C07c** *103/20*

**U.S. Cl. 260—558 A** **13 Claims**

This invention relates to new adamantylalkyl-aminoalkyl benzamides of the general formula



and to acid addition salts and quaternary ammonium salts of such benzamides, substances which are water softeners, inhibit corrosion, arrest cardiac arrhythmia and combat viral infection.

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**3,789,074**

## PARTICLE SIZE-PH EFFECTS ON REDUCED COPPER OXIDE IN PREPARATION OF ACRYLAMIDE

**Virgil L. Seale, Brookhaven, Miss.; Jerry J. Svarz, LaGrange, Ill.; Louis A. Goretta, Naperville, Ill.; John D. Newkirk, Downers Grove, Ill.; Wood E. Hunter, Lombard, Ill., and Frederick J. Sibert, Chicago, Ill., assignors to Nalco Chemical Company, Chicago, Ill.**

**Filed June 23, 1972, Ser. No. 265,902**

**Int. Cl. C07c** *103/08*

**U.S. Cl. 260—561 N** **2 Claims**

A process for catalytically hydrolyzing a nitrile to the corresponding amide by contacting a nitrile with an improved reduced copper oxide catalyst.

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**3,789,075**

## PREPARATION OF HYDROCARBYLAMINE SALT OF THIOCYANIC

**Morris Dundy, Beacon, N.Y., assignor to Texaco Inc., New York, N.Y.**

**Filed Sept. 17, 1971, Ser. No. 181,608**

**Int. Cl. C07c** *87/04*

**U.S. Cl. 260—583 R** **7 Claims**

Method for preparing a hydrocarbylamine salt of thiocyanic acid by reacting equimolar amounts of ammonium thiocyanate and a hydrocarbylamine in the presence of a low molecular weight aliphatic alcohol.

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**3,789,076**

## METHOD FOR TREATING NITROGEN-CONTAINING POLYMERIC DISPERSANTS

**Harry Chafetz, Poughkeepsie; William P. Cullen, Fishkill, and Edward F. Miller, Beacon, all of N.Y., assignors to Texaco Inc., New York, N.Y.**

**Filed Nov. 12, 1971, Ser. No. 198,468**

**Int. Cl. C07g** *17/00*

**U.S. Cl. 260—583 N** **11 Claims**

Method for treating nitrogen-containing polymeric dispersants for mineral lubricating oil compositions comprising heating the dispersant at a temperature in the range from about 200° to 400°C to effect a decomposition of the unstable components present in the dispersant, extracting said reacted or decomposed unstable components with a lower aliphatic alcohol and recovering a dispersant of improved thermal stability.

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**3,789,077**

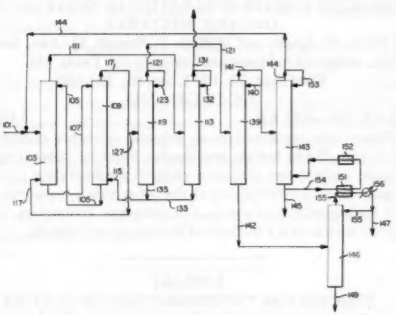
## PROCESS FOR THE SEPARATION OF AROMATIC HYDROCARBONS FROM A MIXED HYDROCARBON FEEDSTOCK

**Alexander J. Kosseim, Yorktown Hgts., and George S. Somekh, New Rochelle, both of N.Y., assignors to Union Carbide Corporation, New York, N.Y.**

**Filed Oct. 6, 1972, Ser. No. 295,521**

**Int. Cl. C07c** *7/10*

**U.S. Cl. 260—674 SE** **8 Claims**



A continuous process for separating aromatic hydrocarbons including benzene and toluene from a mixed hydrocarbon feedstock containing same utilizing two extraction zones and a distillation train wherein light aliphatic impurities are removed from the benzene in an azeotropic distillation zone under specified conditions.

### 3,789,078
### DEHYDROGENATION

**George J. Nolan, Tahlequah, and Robert J. Hogan, Bartlesville, both of Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.**

**Continuation-in-part of Ser. No. 810,831, March 26, 1969, abandoned, which is a continuation-in-part of Ser. No. 654,341, July 19, 1967, abandoned. This application Aug. 26, 1971, Ser. No. 175,398**

**Int. Cl. C07c** *5/18*

**U.S. Cl. 260—680 E** **23 Claims**

Dehydrogenation process using an improved catalyst formed from a phosphorus-containing material such as phosphoric acid, a tin material such as tin chloride, and one of a Group I*a* or II*a* metal or metal-containing material.

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### 3,789,079
### PROCESS FOR THE SEPARATION OF DIENE FROM ORGANIC MIXTURES

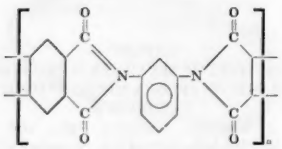
**Eli Perry, St. Louis, and William F. Strazik, St. Ann, both of Mo., assignors to Monsanto Company, St. Louis, Mo.**

**Filed Sept. 22, 1972, Ser. No. 291,452**

**Int. Cl. G07c** *7/00*

**U.S. Cl. 260—681.5 R** **4 Claims**

Dienes are separated from organic mixtures comprising diene and alkene having one double bond by contacting the mixture against one side of a polymeric permeation membrane which is an aromatic imide polymer of the formula



and withdrawing at the other side a vaporous mixture having increased diene concentration. Exemplary of the organic mixtures is a mixture of butadiene and butene.

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### 3,789,080
### PROCESS FOR THE SEPARATION OF DIENE FROM ORGANIC MIXTURES

**Eli Perry, St. Louis, and William F. Strazik, St. Ann, both of Mo., assignors to Monsanto Company, St. Louis, Mo.**

**Filed Sept. 22, 1972, Ser. No. 291,460**

**Int. Cl. C07c** *7/00*

**U.S. Cl. 260—681.5 R** **4 Claims**

Dienes are separated from organic mixtures comprising diene and alkene having one double bond by contacting the mixture against one side of a glycidyl methacrylate polymer membrane and withdrawing at the other side a vaporous mixture having increased diene concentration. Exemplary of the organic mixtures is a mixture of butadiene and butene.

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### 3,789,081
### PROCESS FOR THE PRODUCTION OF OLEFINS

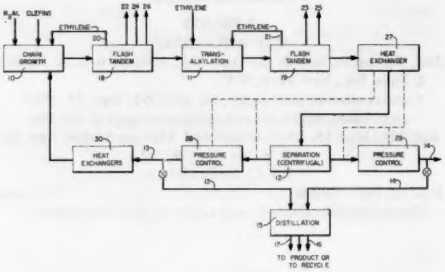
**Carroll W. Lanier, Zachary, La., assignor to Ethyl Corporation, New York, N.Y.**

**Division of Ser. No. 853,306, Aug. 27, 1969, Pat. No. 3,663,647. This application Aug. 10, 1971, Ser. No. 170,580. The portion of the term of this patent subsequent to May 16, 1989, has been disclaimed.**

**Int. Cl. C07c** *3/10*

**U.S. Cl. 260—683.15 D** **10 Claims**

Olefins in the range of six to 20 carbon atoms are prepared by feeding lower olefin (e.g., ethylene), lower alkyl organometallic (e.g., triethyl aluminum) and product olefin into a reaction system in which chain buildup occurs (e.g., chain growth or catalytic polymerization). The reaction effluent is flashed to remove product olefin and lower boiling olefin. The remainder of the effluent contains higher alkyl organometallic and is subjected to an alkyl displacement reaction using lower olefin (e.g., ethylene) to give a mixture of olefins (both in and




outside of product range) along with lower alkyl organometallic. Olefins having more than about 16 carbon atoms per molecular are separated and a stream containing lower alkyl organometallic adjuvant and product olefin is recovered for delivery to the first-named reaction system.

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### 3,789,082
### ISOMERISATION OF PARAFFIN HYDROCARBONS

**Terence John Cook, Twickenham, and Martin Frederick Olive, Lightwater, both of England, assignors to The British Petroleum Company Limited, London, England**

**Filed Jan. 5, 1972, Ser. No. 215,650**

**Claims priority, application Great Britain, Jan. 26, 1971, 03161/71**

**Int. Cl. C07c** *5/24, 5/28*

**U.S. Cl. 260—683.68** **11 Claims**

In the start up of a paraffin isomerisation process operating at 100°-204°C in the presence of HCL or a compound decomposable to it as activating agent, the catalyst bed is brought to at least 100°C, preferably, at least 130°C before the feedstock and activating agent contact the bed. Starting up the process in conventional manner at low temperature and gradually bringing the temperature up in the presence of feedstock and activating agent partially deactivates the catalyst.

The preferred catalyst is one obtained by chlorinating platinum-alumina with $CCl_4$ or an analogous derivative of methane and the preferred activating agent is $CCl_4$. Preferred feedstocks are $C_4$–$C_6$ paraffins, possibly containing 0.1–5% wt.

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### 3,789,083
### PROCESS FOR THE PREPARATION OF VINYL CHLORIDE POLYMERS GRAFTED ON POLYMERS OF ETHYLENE

**Joseph Dumoulin, Wezembeek-Oppem, and Marc Obsomer, Brussels, both of Belgium, assignors to Solvay & Cie, Brussels, Belgium**

**Filed July 6, 1971, Ser. No. 160,100**

**Claims priority, application France, July 6, 1970, 70.25058; May 11, 1971, 71.17076; May 11, 1971, 71.17077; May 25, 1971, 71.18971**

**Int. Cl. C08f** *3/04, 3/20*

**U.S. Cl. 260—878** **11 Claims**

Grafted polymers of vinyl chloride are prepared by polymerizing or copolymerizing vinyl chloride in the presence of an ethylene backbone polymer composed of polyethylene

an ethylene copolymer or mixture thereof which has a fusion index ≦ 250, from 0.2 to 4 double bonds per 1000 carbon atoms and/or from 5 to 30 methyl groups per 1,000 carbon atoms, under a partial pressure of vinyl chloride which is lower at all times during the polymerization than the saturated vapor pressure of vinyl chloride at the temperature of polymerization. Homogeneous products having a high degree of grafting and excellent thermal resistance and which provide in combination with polymers of vinyl chloride, compositions having improved resistance to shock, excellent transparency and processibility, are obtained by this process.

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**3,789,084**

**BLENDS OF STYRENE/ACRYLONITRILE COPOLYMERS WITH BLOCK COPOLYMERS CONTAINING LACTONES AND A RESINOUS OR RUBBERY POLYMER**

**Clifford W. Childers, and Earl Clark, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.**

**Continuation-in-part of Ser. No. 29,687, April 17, 1970, Pat. No. 3,649,716. This application Oct. 4, 1971, Ser. No. 186,433**

**Int. Cl. C08q** *39/10*

**U.S. Cl. 260—873** **9 Claims**

The impact strength of styrene/acrylonitrile copolymers is greatly improved by blending therewith a conjugated diene block copolymer containing a lactone and a resinous or rubbery polymer.

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**3,789,085**

**POLYETHYLENE BLOCK-GRAFT COPOLYMERS AND METHOD FOR PREPARING THE SAME**

**Akira Kishimoto, Ota; Sadao Hirata, and Hiroshi Ueno, both of Kanagawa, all of Japan, assignors to Toyo Seikan Kaisha, Ltd., Tokyo, Japan**

**Continuation-in-part of Ser. No. 862,392, Sept. 30, 1969, abandoned. This application Nov. 30, 1971, Ser. No. 203,252**

**Claims priority, application Japan, Oct. 9, 1968, 43-73179**

**Int. Cl. C08f** *29/12*

**U.S. Cl. 260—897 B** **3 Claims**

The present invention provides a block-graft copolymer of polyethylene and saponified ethylene vinyl acetate with improved moisture permeability by heating a mixture of polyethylene and a saponified ethylene-vinyl acetate copolymer to an elevated temperature and kneading the mixture under pressure. The saponified ethylene-vinyl acetate copolymer has a degree of saponification of 99% or more and consists of from 30 to 50 mol percent of ethylene, the remainder being vinyl acetate, the polyethylene being a powdery high density polyethylene which has not been subjected to heating and kneading after polymerization, the mixture containing the high density polyethylene and the saponified ethylene-vinyl acetate copolymer at a weight ratio of 98:2 to 80:20 and from 0.2 to 0.6 percent by weight based on the weight of the mixture, of a radical forming catalyst, and the mixture being heated to a temperature of from 200° to 205°C and kneaded under a pressure of 330 to 470 kg/cm².

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**3,789,086**

**METHOD FOR PRODUCING CHROMANOLS**

**Heinrich Frick, Riehen; Niklaus Halder, and Willy Vogler, both of Oberwil, all of Switzerland, assignors to Hoffman-La Roche Inc., Nutley, N.J.**

**Filed Dec. 29, 1971, Ser. No. 213,831**

**Claims priority, application Switzerland, Jan. 11, 1971, 328/71**

**Int. Cl. C07d** *7/26*

**U.S. Cl. 260—345.5** **7 Claims**

A process for producing chromanols such as Vitamin E by condensing an isoprenol or isoprenol derivatives with a hydroquinone in the presence of hydrogen chloride and an iron component which can be iron, ferrous chloride or mixtures thereof.

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**3,789,087**

**4,6-DICHLOR-$\Delta^{4,6}$-STEROIDS AND METHOD OF MAKING AND USING THE SAME**

**Rudolf Wiechert, and Friedmund Neumann, both of Berlin, Germany, assignors to Schering AG, Berlin, Germany**

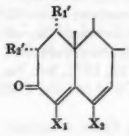
**Filed June 5, 1968, Ser. No. 734,513**

**Claims priority, application Germany, June 9, 1967, Sch 40852**

**Int. Cl. C07c** *169/34*

**U.S. Cl. 260—397.3** **1 Claim**

4,6-dichlor-$\Delta^{4,6}$-steroids of the pregnane and androstane series are produced by reacting a 4-chlor- or a 6-chlor-$\Delta^{4,6}$-steroid which includes a group of the formula:




wherein $X_1$ and $X_2$ are different and respectively denote hydrogen or chlorine, and wherein each of $R_1'$ and $R_2'$, respectively, is hydrogen, or $R_1'$ and $R_2'$ jointly denote a methylene group, with compounds capable of forming, respectively, positive and negative chlorine ions; and treating the thus-obtained reaction product with a base.

The thus-obtained novel compounds, in the form of pharmaceutical compositions for oral or intramuscular administration are useful in the treatment of gynecological disorders and as contraceptive.

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**3,789,088**

**DIMERS OF HEXAFLUOROPROPENE AND PROPYLENE**

**William Alfred LaLande, Jr., Philadelphia; Murray Hauptschein, Glenside, and Robert Bonner Hager, Collegeville, all of Pa., assignors to Pennwalt Corporation, Philadelphia, Pa.**

**Filed May 24, 1971, Ser. No. 146,503**

**Int. Cl. C07c** *23/06*

**U.S. Cl. 260—648 F** **2 Claims**

Cis and trans-1-trifluoromethyl-1,2,2-trifluoro-4-methylcyclobutane and mixtures thereof are provided. These compositions are liquids having high dielectric constant and low freezing points, useful as working fluids for hydraulic systems and as inert solvents. Also provided are linear dimers, 4,4,5,6,6,6-hexafluorohexene-1 and 4,4,5,6,6,6-hexafluorohexene-2, useful as co-monomers in ethylene and propylene polymerization.

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**3,789,089**

**HALOADAMANTANES**

**Robert E. Moore, Wilmington, Del., assignor to Sun Research and Development Co., Philadelphia, Pa.**

**Division of Ser. No. 784,486, Dec. 17, 1968, Pat. No. 3,666,806. This application Sept. 20, 1971, Ser. No. 182,217**

**Int. Cl. G07c** *17/00*

**U.S. Cl. 260—648 R** **9 Claims**

Halogenated derivatives containing the adamantane nucleus are produced by admixing, in the presence of strong sulfuric acid, adamantane or alkyl-substituted adamantane with a selected halo-yielding salt of an alkali or alkaline earth metal, or a corresponding hydrogen halide.

**3,789,090**

## PROCESS FOR THE PRODUCTION OF CONJUGATED DIENE LIQUID POLYMERS

**Yutaka Otsuki, Kawasaki; Hajime Hara, Fujisawa, and Nobuo Imai, Kawasaki, all of Japan, assignors to Nippon Oil Co., Ltd., Tokyo, Japan**

**Filed June 4, 1970, Ser. No. 43,588**
**Claims priority, application Japan, June 14, 1969, 44-46731**
**Int. Cl. C07c** *15/10;* **C08d** *3/04;* **C08f** *3/16*
**U.S. Cl. 260—669 P** **6 Claims**

A process is disclosed for the production of liquid polymers by polymerizing conjugated diolefins or copolymerizing these diolefins with vinyl compounds in the presence of particularly organosodium catalysts, where the resulting polymers are controlled in the desired average molecular weight and have very low color.

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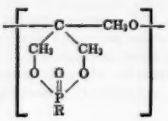
**3,789,091**

## CYCLIC PHOSPHONATE ESTERS AND THEIR PREPARATION

**James J. Anderson, Metuchen; Vasco G. Camacho, Iselin, and Robert E. Kinney, Lawrenceville, all of N.J., assignors to Mobil Oil Corporation, New York, N.Y.**

**Filed Nov. 15, 1971, Ser. No. 199,022**
**Int. Cl. C07d** *105/04;* **C08f** *45/58*
**U.S. Cl. 260—927 R** **14 Claims**

Polymers containing flame retardant amounts of addition products of alkylhalogen-free esters of (1*a*) phosphorus acids, (1*b*) carboxylic acids, or (1*c*) sulfonic acids and (2) a bicyclic phosphite (1-alkyl-4-phospha-3,5,8-trioxabicyclo-[2,2,2]-octane), said addition products having the following group;



where R is lower alkyl $C_1$–$C_4$), preferably $C_1$–$C_2$, an hydroxyalkyl ($C_1$–$C_4$), preferably $C_2$–$C_3$;
the addition products of (1*a*) or (1*b*) and (2); and preparation of the addition products by heating a mixture of (1*a*) or (1*b*) and (2) to an elevated temperature (e.g., 175°–300°C.).

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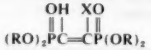
**3,789,092**

## HALOVINYLENE-1,2-BIS(PHOSPHONIC ESTERS)

**Ludwig Maier, Kilchberg, Switzerland, assignor to Monsanto Company, St. Louis, Mo.**

**Filed June 9, 1972, Ser. No. 261,171**
**Int. Cl. G07f** *9/40*
**U.S. Cl. 260—932** **4 Claims**

Halovinylene-1,2-bis(phosphonic acids) and their corresponding esters of the formula



wherein R is hydrogen or a hydrocarbon radical having for example from 1–24 carbon atoms and X is a halogen atom e.g. chlorine or bromine. The halovinylene acids are obtained by hydrolysis or an ethynylene-1,2,-bis(phosphonic acid diester) of the formula

with concentrated aqueous haloacid (HX). The acids are useful as flameproofing agents for combustible organic materials, as inhibitors for metal corrosion, as inhibitors for scale formation and as intermediates in the formation of the corresponding monoesters and diesters. The esters are useful as plasticizers, lubricants, lubricant additives and functional fluids.

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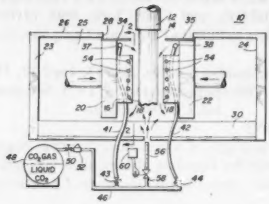
**3,789,093**

## METHOD FOR ACCELERATING THE MOLDING CYCLE BY BLANKETING WITH DRY CARBON DIOXIDE GAS

**Robert N. Bose, 3117 Roberts St., New Orleans, La.**

**Continuation-in-part of Ser. No. 8,350, Feb. 3, 1970, abandoned. This application Dec. 8, 1971, Ser. No. 205,823**
**Int. Cl. B29c** *17/07*
**U.S. Cl. 264—37** **4 Claims**




Process of accelerating the molding cycle when using blow molding or injection molding machines including providing an enclosure around the molding area and supplying to said enclosure an atmosphere for blanketing the mold area with carbon dioxide gas to reduce the dew point in the mold cavities whereby the molds may be operated at a lower temperature without causing surface imperfections on the molded part. In other embodiments multi-station blow molding and injection molding machines include an enclosed mold area into which exhaust carbon dioxide is vented to maintain the dew point at a value below that of the ambient.

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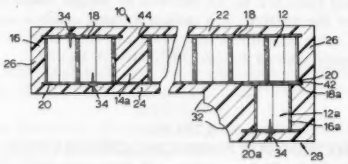
**3,789,094**

## METHOD OF PRODUCING A MOLDED FOAMED STRUCTURAL MEMBER HAVING A HONEYCOMB CORE ADAPTED FOR VENTING

**David John Hutchison, Toronto, Ontario, Canada, assignor to Monostruct Corporation, Limited, Toronto, Ontario, Canada**

**Filed May 6, 1971, Ser. No. 140,748**
**Int. Cl. B29d** *27/04*
**U.S. Cl. 264—45** **7 Claims**



A cored, molded structural member comprises a core having a plurality of cells between major faces - a honeycomb core - and having a substantially seamless covering of moldable plastic material which expands while it sets and which, when set, is substantially rigid. Foamable polyurethane is particularly contemplated. At least some of the cells of the core are adapted to have gas communication with other, adjacent

cells when the pressure of the gas and/or air within the cell rises. The molded structural member is formed in a mold which is entirely closed and gas tight so as to preclude flow of gas or air outwardly from the mold cavity during the molding operation. Spacers may be used to space the core away from the faces of the mold cavity, and to keep the core from shifting within the mold cavity as the plastic material expands and sets. Pressure relief of the pressurized mold is usually provided before the mold is opened, by making one or more channels through the plastic covering in the core.

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**3,789,095**

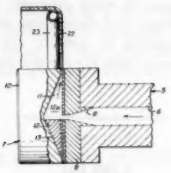
## CONTINUOUS METHOD OF MANUFACTURING ARTICLES FROM FOAMED THERMOPLASTIC MATERIAL

**Thomas W. Winstead, 2 Overlook Ln., Baltimore, Md.**

**Continuation-in-part of Ser. No. 798,821, Oct. 10, 1968, abandoned, which is a division of Ser. No. 480,917, Aug. 19, 1965, Pat. No. 3,479,694. This application Jan. 15, 1971, Ser. No. 106,861. The portion of the term of this patent subsequent to June 13, 1989, has been disclaimed.**

**Int. Cl. B29d** *7/04, 7/24, 27/00*

**U.S. Cl. 264—51** **12 Claims**



An integrated method of continuously extruding low-density foamed thermoplastic material and manufacturing three-dimensionally formed articles therefrom. The method includes the steps of extruding and spreading a narrow strip of thermoplastic material at a high linear rate, vacuum forming articles therefrom on the periphery of a forming wheel (utilizing the heat of extrusion), severing the formed articles from the strip, packaging the articles, and returning the selvage for re-use.

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**3,789,096**

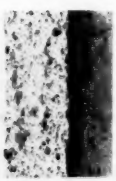
## METHOD OF IMPREGNATING POROUS REFRACTORY BODIES WITH INORGANIC CHROMIUM COMPOUND

**Peter K. Church, Cascade, and Oliver J. Knutson, Colorado Springs, both of Colo., assignors to Kaman Sciences Corporation, Colorado Springs, Colo.**

**Continuation-in-part of Ser. No. 642,704, June 1, 1967, abandoned. This application Dec. 28, 1967, Ser. No. 694,303**

**Int. Cl. C04b** *41/24, 41/06*

**U.S. Cl. 264—60** **26 Claims**



A new ceramic treatment process and product and, more particularly, a process for forming and treating and shaping and treating of porous skeletal bodies to produce hardened dimensionally stable end products at relatively low temperature and the resulting materials produced thereby which comprises the steps of treating a porous skeletal body by impregnating the interstices of the porous body with a comound of a metal capable of being converted to an oxide in situ at relatively low temperatures, heating the body so impregnated at temperature well below normal vitrification to a temperature of at least 600°F. and for a period of time sufficient to convert the compound impregnated therein to an oxide and repeating the impregnation and heating steps until the desired degree of hardness is obtained.

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**3,789,097**

## PROCESS FOR PRODUCING PELLETIZED METAL SULFIDE MATERIALS

**Russell R. Beck; David B. George, and Charles W. Anderson, all of Salt Lake City, Utah, assignors to Kennecott Copper Corporation, New York, N.Y.**

**Filed Aug. 2, 1971, Ser. No. 168,003**

**Int. Cl. B01j** *2/04*

**U.S. Cl. 264—82** **8 Claims**

A process of producing pelletized metal sulfide material bonded by reaction products of lime contacted by sulfur dioxide, so that the resulting pellets will have cohesive strength capable of withstanding the rough handling normally received in industrial smelting operations, comprises the steps of forming green pellets from a metal sulfide agglomerate prepared by mixing particulate metal sulfide material with lime in the presence of sufficient water to form a cohesive mixture, and of exposing the pellets to an effective amount of sulfur dioxide gas (which in the presence of moisture is converted to sulfurous acid) to react with the lime at temperatures ranging from room temperature to 100°C. to form calcium sulfite and calcium sulfate bonding agents. The hardness of the resulting pellets is increased many times over that achieved by the usual procedure of simple drying of metal sulfide material to form pellets which disintegrate prematurely when employed in commercial smelting operations. If a greater degree of hardness is necessary for some applications, the bonded pellets of the invention can be subjected to higher temperatures, imparting a degree of hardness to the pellets related to the temperature to which the pellets are exposed and the length of time of exposure.

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## ERRATUM

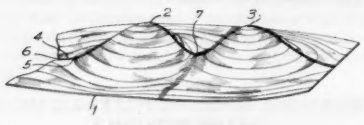
For Class 264—95 see:
Patent No. 3,788,503

3,789,098

## METHODS AND APPARATUS FOR CONSTRUCTING KNITTED BRASSIERE BLANKS AND BRASSIERES

Raymond C. Cole, Hillsdale, N.J.; William C. Hittel, New Hyde Park, N.Y., and James G. Donaghy, Flanders, N.J., assignors to International Playtex Corporation, New York, N.Y.

Filed June 11, 1971, Ser. No. 152,245
Int. Cl. D04b *11/36*
U.S. Cl. 264—103 16 Claims




There is disclosed as an article of manufacture an integrally knit blank shaped to allow for the reorientation of the wales along the apex of the cup and to allow for the reorientation of the wales along the body of the breast receiving elements at least along the area which will comprise the lower cup portion, to an orientation other than originally knitted. There is also disclosed a flat boarding arrangement as the shaping apparatus as well as the stabilizing form. The method of knitting and shaping generally includes the steps of integrally knitting, with at least some heat setting yarns a blank having relatively concial breast pockets and a relative flat apex area; reorienting a portion of the yarns in the apex area to provide a relatively rounded apex configuration; and heat setting the blank to retain the apex area in such relatively rounded configuration.

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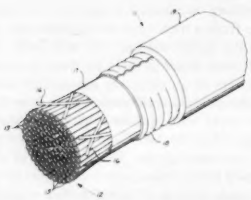
3,789,099

## METHODS OF MANUFACTURING WATERPROOF CABLE

Carl Eugene Garrett, Stone Mountain, Ga.; William Henry Kinsley, Jr., Omaha, and Larry Dean Moody, Ralston, both of Nebr., assignors to Western Electric Company, Incorporated, New York, N.Y.

Filed Nov. 9, 1971, Ser. No. 196,949
Int. Cl. B32b *31/06*
U.S. Cl. 264—174 10 Claims



Successive sections of a cable core having twisted pairs of insulated conductors stranded together are moved axially longitudinally through a series of in-line chambers having interconnecting dies of an apparatus with facilities for the pressure application of a heated waterproofing compound having a jelly-like consistency into the interstices between the stranded pairs of conductors. The apparatus is designed to direct the compound inwardly radially of the core after which a flow path of the compound is established into an upstream direction relatively longitudinally of the advancing cable core to more completely fill the interstices of the completed core. Provisions are made for cooling the cable core both prior to the filling thereof to limit the movement upstream of the compound and subsequent to the filling of the core to solidify and render self-sealing the compound.

Subsequently, the successive sections of the compound filled core are advanced through various stations whereat a core wrap and sheath are applied thereto together with additional applications of the waterproofing compound. A plastic jacket is extruded about the sheath and cooled prior to taking up of the successive sections of the jacketed cable onto a take-up reel.

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3,789,100

## PROCESS FOR MOLDING OBJECTS FROM RAPID-SETTING POLYURETHANE COMPOSITIONS

Earle L. Kropscott, and Gerald R. Wittenbach, both of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed June 19, 1972, Ser. No. 264,058
Int. Cl. B29c *1/02*, *1/08*
U.S. Cl. 264—219 8 Claims

Molded polyurethane objects are prepared from rapid-setting polyurethane compositions employing molds prepared from foamed polymers of vinyl aromatic compounds. The molds retain their shape and dimensions sufficiently for the polyurethane composition to solidify and then the mold distorts and shrinks away from the molded object.

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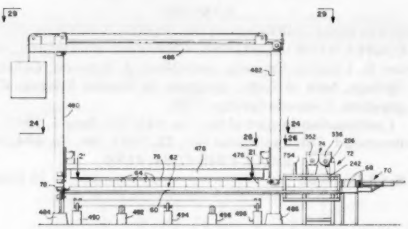
3,789,101

## PANEL MANUFACTURING MACHINE AND METHOD

Lawrence W. Wright, Scottsdale; Leon H. Tolleson; Daniel P. Abrahamson, both of Phoenix; Paul M. Thomas, Paradise Valley, and Eugene E. Crile, Phoenix, all of Ariz., assignors to The Thomas 1970 Trust, Phoenix, Ariz.

Continuation-in-part of Ser. No. 132,788, April 9, 1971, abandoned. This application Apr. 30, 1971, Ser. No. 138,949
Int. Cl. E04d *2/02*
U.S. Cl. 264—261 8 Claims

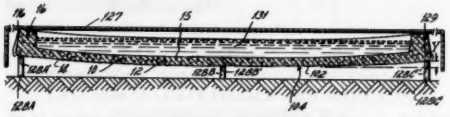


A panel manufacturing machine and method adapted to produce panels of building blocks; the machine and method involving the formation of a horizontal course of blocks in end-to-end relation to each other with mortared head joints between ends of the blocks and with bed mortar on top of the blocks, which course is transferred as a unit to be assembled with other courses of blocks to produce a panel. Further, the machine and method can progressively sense a modular measurement longitudinally of said course to control the overall length of each course when assembled and mortared together.

## 3,789,102
## METHOD FOR FORMING A FLANGED CONCRETE PANEL HAVING A PLANAR CENTRAL SECTION

Earl T. Hazelett, Jr., Phoenix, Ariz., assignor to Continental Homes, Inc., Pheonix, Ariz.

Continuation-in-part of Ser. No. 2,263, Jan. 12, 1970, abandoned. This application Feb. 26, 1971, Ser. No. 119,159
Int. Cl. B28b *21/92*
U.S. Cl. 264—295 9 Claims

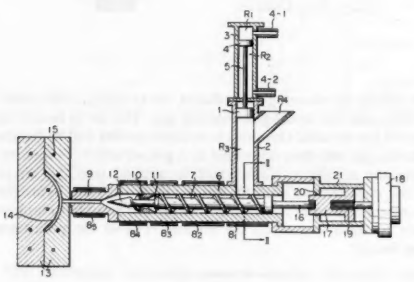


Fabrication of a flanged concrete panel includes pouring concrete into a suitably configured mold of elastically deformable material in which reinforcing frame and mesh is appropriately located; partially curing the panel while supporting the mold such that under the weight of the concrete contained therein it deflects in a direction countervailing the normal shrinkage deformation direction. The partially cured panel is removed from the mold and allowed to undergo its normal curing shrinkage deformation to yield a panel having a planar face.

## 3,789,103
## PROCESS FOR INJECTION MOLDING POLYESTER PREMIXES

Toshihiko Sueyoshi, and Mitsuo Kozawa, both of Aki District, Japan, assignors to Japan Steel Works Ltd., Tokyo, Japan

Filed Aug. 12, 1971, Ser. No. 171,240
Claims priority, application Japan, Sept. 4, 1970, 45-77028
Int. Cl. B29f *1/08*
U.S. Cl. 264—329 1 Claim

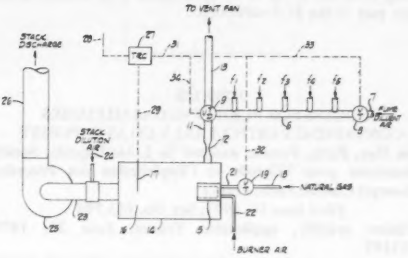


Putty-like raw material composed of fluid polyester with added fillers, pigments, reinforcements, etc. is forced into a screw containing heating cylinder through a push chamber which communicates with said heating cylinder by a converging flow passage so that the temperature of said material is raised by the shearing action and the external heating to which it is subject during its passing through said passage, the raw material thus supplied into said heating cylinder is advanced forwardly by the rotating screw so that its temperature is regulated from externally of said heating cylinder, and, after it is heated again at the front end portion of the heating cylinder, it is injected into dies and reflux thereof is prevented.

## 3,789,104
## CONTROL METHOD FOR FUME INCINERATORS

Albert P. McCauley, Chagrin Falls, Ohio, assignor to SCM Corporation, Cleveland, Ohio

Filed Feb. 25, 1971, Ser. No. 118,854
Int. Cl. B01d *53/34*
U.S. Cl. 423—210 12 Claims

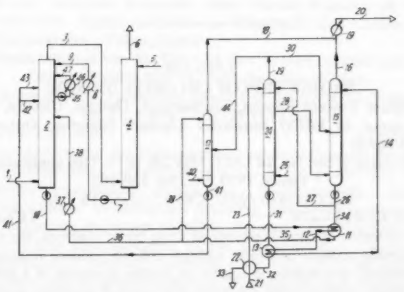



Improved process and apparatus are shown for incineration of combustible fumes to suppress deleterious, uncontrolled combustion of said fumes from the occurrence of an adventitious, transient fume overload. In response to upward deviation from a preselected incineration temperature, the fume feed flow is automatically throttled to bypass the incineration zone while the flow of primary incineration fuel has been automatically diminished, but at most only to a point short of the extinction of its combustion, thereby relieving the overload condition without disruptive operational discontinuity. An automatic temperature controller provides the particular sequential throttling control impulse to automatic throttling valves on primary fuel and bypass for this purpose, and also to an automatic throttling valve on flow of fume diluent vapors, if desired.

## 3,789,105
## AMMONIA-HYDROGEN SULFIDE-CYCLE SCRUBBING METHOD FOR CRUDE COKE OVEN GASES

Kurt Tippmer, and Dieter Laufhutte, both of Recklinghausen, Germany, assignors to Firma Carl Still, Recklinghausen, Germany

Filed Nov. 10, 1971, Ser. No. 197,372
Claims priority, application Germany, Nov. 28, 1970, 2058709
Int. Cl. C01b *31/20*
U.S. Cl. 423—234 6 Claims



Continuous treating process for scrubbing ammonia rich coke oven gases containing $H_2S$ involves regenerating am-

monia rich $H_2S$ wash liquor in a deacidifier and distilling the ammonia from the $NH_3$ scrubber in a still. The cyclic process is carried out in two cycles: a first cycle in which regenerated, cooled, aqueous ammoniacal solution is circulated from the sump of the deacidifier to about the center or the upper parts of the $H_2S$-scrubber, and from the sump of the $H_2S$-scrubber back to the upper part of the deacidifier; and a second, hot cycle in which the regenerated aqueous ammoniacal solution issuing from the sump of the deacidifier is circulated to the upper part of the $H_2S$-scrubber.

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**3,789,106**

**PROCESS FOR PURIFYING GAS MIXTURES CONTAINING PARTICULARLY CO AS IMPURITY**

**Leon Hay, Paris, France, assignor to L'Air Liquide, Societe Anonyme pour l'Getude et l'Exploitation des Procedes, Georges Claude, Paris, France**

**Filed June 16, 1971, Ser. No. 153,798**

**Claims priority, application France, June 23, 1970, 70.23107**

**Int. Cl. B01d** *53/34*

**U.S. Cl. 423—247** **2 Claims**

The present invention has for its object a process by which traces of carbon oxide contained in a gas mixture of which the CO partial pressure is low are eliminated by adsorption, by the said mixture being brought into contact with a purifying mass formed of mordenite charged with copper.

The present invention has for its object an improved process for purifying gas mixtures which contain particularly the carbon oxide CO as impurity.

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**3,789,107**

**PROCESS FOR PRODUCING A CRYSTALLINE ZEOLITE**

**Curtis H. Elliott, Jr., Baltimore, Md., assignor to W. R. Grace & Co., New York, N.Y.**

**Filed May 4, 1971, Ser. No. 140,249**

**Int. Cl. C01b** *33/28*

**U.S. Cl. 423—329** **5 Claims**

Faujasitic-type crystalline zeolites X and Y are produced. In one embodiment, sodium sulfide is added to the reaction mixture as a source of sodium and as a buffer. The buffering action of the sodium sulfide provides the basicity required to maintain the alumina hydrate component of the reaction mixture in solution but not a basicity whereby zeolite crystallization is retarded. In another embodiment, a nucleating mixture having the formula 3-10$Na_2S$: 5–15 $Na_2O$: 5–50 $SiO_2$: 0.4–4.0 $Al_2O_3$: 50–500$H_2O$ is added to the reaction mixture to promote crystall;ne zeolite formation.

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**3,789,108**

**PRODUCTION OF CHLORINE DIOXIDE**

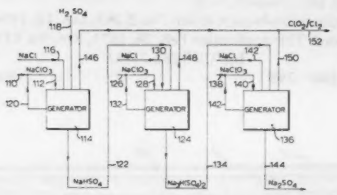
**William Howard Rapson, Scarborough, Ontario, Canada, assignor to ERCO Industries Limited, Islington, Ontario, Canada**

**Division of Ser. No. 147,821, May 28, 1971. This application Feb. 8, 1973, Ser. No. 330,602**

**Int. Cl. C01b** *11/02*; **C01d** *5/02*; **C01h** *7/02*

**U.S. Cl. 423—478** **4 Claims**

Chlorine dioxide is produced from three reactors, the first reacting sodium chlorate, sodium chloride and/or hydrogen chloride, and sulphuric acid at an acidity in excess of 4.8N to deposit sodium acid sulphate, the second reacting sodium chlorate, sodium chloride and/or hydrogen chloride, and a sulphate-ion material which is constituted at least in part by the sodium acid sulphate deposited in the first reaction, at an acidity greater than 4.8N to deposit sodium sesquisulphate. In the third vessel sodium chlorate, sodium chloride and/or hydrogen chloride and a sulphate-ion material which is constituted at least in part by the sodium sesquisulphate at an acidity less than 4.8N to deposit sodium sulphate.

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**3,789,109**

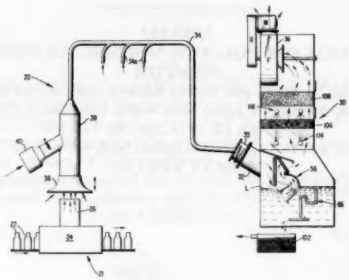
**METHOD FOR CLEANING A GAS**

**Richard S. Lyon, Carroll, Ohio, and Ralph L. Lyon, Wheaton, Ill., assignors to United McGill Corporation, Columbus, Ohio**

**Filed Aug. 13, 1971, Ser. No. 171,686**

**Int. Cl. B01d** *53/34*; **C01b** *7/08*; **C01w** *19/02*

**U.S. Cl. 423—481** **23 Claims**



A system for cleaning air polluted, for example, with metallic chlorides and hydrogen chloride gas. The air is heated to convert the metallic chlorides to metallic oxides and hydrogen chloride gas and then conveyed to a gas scrubber. Before entering the scrubber, fresh water is sprayed into the air to rapidly cool the air and the water reacts with the hydrogen chloride gas to form hydrochloric acid. The scrubber employs water to wash and scrub the air and remove the pollutants from the air.

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**3,789,110**

**METHOD FOR REMOVING SULFUR DIOXIDE FROM WASTE GASES AND RECOVERING A CONCENTRATED STREAM OF SULFURDIOXIDE**

**Frank J. Ball, Charleston, S.C., assignor to Westvaco Corporation, New York, N.Y.**

**Filed July 23, 1971, Ser. No. 165,051**

**Int. Cl. C01b** *17/60*

**U.S. Cl. 423—539** **10 Claims**

A method of removing sulfur dioxide from waste gas mixtures comprising adsorbing sulfur dioxide onto activated carbon as sulfuric acid at a temperature between ambient temperature and 350° F., subsequently reacting the sulfuric acid laden activated carbon with the correct proportion of hydrogen sulfide at a temperature below 350° F., preferably

200°–350°F., to homogeneously reduce all the hydrogen sulfide and a portion of the adsorbed sulfuric acid to elemental sulfur, then raising the temperature to between 350° to 1000° F. to react the elemental sulfur and remaining sulfuric acid to form concentrated sulfur dioxide without reaction with the activated carbon, recovering said sulfur dioxide from the activated carbon, and recycling the completely regenerated activated carbon. The recovered sulfur dioxide may be used in a variety of ways, for instance, it may be reacted with methane to produce hydrogen sulfide, it may be reacted with hydrogen sulfide as in a Claus unit to produce elemental sulfur, or it may be converted to sulfuric acid.

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**3,789,111**

## PROCESS OF MANUFACTURING ANHYDROUS CALCIUM SULFATE FORM II AND PRODUCTS OBTAINED BY THIS PROCESS

**Patrice Chaurand, Ancone; Regis Magnan, Montelimar, and Jean-Paul Coquery, Lyon, all of France, assignors to Progil and Ciments Lafarge, Paris, France**

**Filed Dec. 14, 1970, Ser. No. 97,947**

**Claims priority, application France, Jan. 6, 1970, 70.00480**

**Int. Cl. C01f** *11/46*

**U.S. Cl. 423—555** **8 Claims**

A process of making anhydrous calcium sulfate form II from synthetic gypsum by heating to a temperature of 325°–450°C. in the presence of steam as catalyst for a period of time necessary to convert the gypsum into the anhydrous calcium sulfate II; the product may be ground and $K_2SO_4$ and/or sodium fluosilicate added.

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**3,789,112**

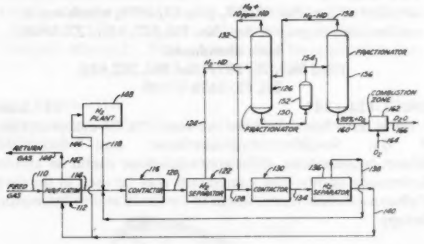
## PROCESS FOR OBTAINING DEUTERIUM FROM HYDROGEN-CONTAINING COMPONENTS AND THE PRODUCTION OF HEAVY WATER THEREFROM

**Robert W. Pachaly, Pittsburgh, Pa., assignor to Gulf Research & Development Company, Pittsburgh, Pa.**

**Filed Oct. 28, 1970, Ser. No. 84,578**

**Int. Cl. C01b** *5/02, 4/00*

**U.S. Cl. 423—580** **14 Claims**




The deuterium naturally present in the chemical compounds is transferred to hydrogen having less than normal deuterium content after which the deuterium is recovered from the hydrogen and the recovered deuterium can be oxidized to form deuterium oxide or heavy water.

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**3,789,113**

## MODIFIED SYSTEM FOR HEAVY WATER PRODUCTION

**Victor R. Thayer, Newark, Del., assignor to Canadian General Electric Company Limited, Toronto, Ontario, Canada**

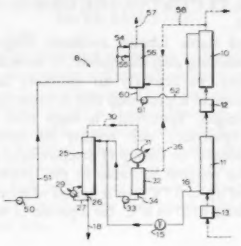
**Filed Jan. 29, 1971, Ser. No. 110,993**

**Claims priority, application Canada, Feb. 4, 1970, 73903**

**Int. Cl. C01b** *5/02, 17/16*

**U.S. Cl. 423—580** **7 Claims**

In a heavy water isotopic separation process wherein hydrogen sulphide is separated from waste water and recirculated back to the process by absorption into incoming feed water, the pressures of feed water and the pressure of gas ex-



tracted from the waste water are controlled to permit reabsorption of the gas without intermediate recompression.

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**3,789,114**

## PROCESS FOR THE PRODUCTION OF HYDROGEN PEROXIDE BY THE ANTHRAQUINONE PROCESS

**Gunter Giesselmann, Heusenstamm; Gerd Schreyer, Grossauheim, and Wolfgang Weigert, Offenbach, all of Germany, assignors to Deutsche Gold- und Silber-Scheidean-Stalt vormals Roessler, Frankfurt (Main), Germany**

**Filed Jan. 27, 1972, Ser. No. 221,444**

**Claims priority, application Germany, Jan. 30, 1971, 2104432**

**Int. Cl. C01b** *15/02;* **B01j** *1/16*

**U.S. Cl. 423—588** **22 Claims**

Hydrogen peroxide is produced by the anthraquinone process employing a stabile 1, 3, 5-triazine as the solvent for the reaction carrier.

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**3,789,115**

## PROCESS FOR PREPARING A HIGHLY SELECTIVE CATALYST USED IN THE PRODUCTION OF HYDROGEN PEROXIDE

**Shiro Matsumura; Hiroshi Shin; Junichiro Sugano; Tadashi Yoshii; Yasuhisa Kuriyama, and Takeshi Komaki, all of Yokkaichi, Japan, assignors to Mitsubishi Gas Chemical Company, Inc., Tokyo, Japan**

**Continuation of Ser. No. 864,524, Oct. 7, 1969, abandoned. This application July 14, 1971, Ser. No. 162,616**

**Claims priority, application Japan, Oct. 14, 1968, 43-74206**

**Int. Cl. C01b** *15/02;* **B01j** *11/08*

**U.S. Cl. 423—588** **8 Claims**

In a process for the hydrogenation of an anthraquinone to the corresponding anthrahydroquinone in the production of hydrogen perioxide comprising hydrogenating said anthraquinone, oxidizing the resulting anthrahydroquinone and extracting hydrogen peroxide, the step comprising conducting said hydrogenation in the presence of a selective hydrogenation catalyst consisting essentially of a member selected from the group consisting of palladium black, palladium supported on a carrier, nickel, a palladium compound and a palladium compound supported on a carrier, wherein said catalyst has been treated with hydrogen or a molecular hydrogen containing gas at a temperature of from 150° to 650°C and for a period of time of from 10 to 240 minutes.

3,789,116

## FLUORESCENT LABELED ANTIBODY REAGENT

John William Dixon Kay, Zion, Ill., assignor to Abbott Laboratories, Chicago, Ill.

Filed Dec. 9, 1970, Ser. No. 96,636
Int. Cl. C12k 1/00, 1/04; G01n 33/16
U.S. Cl. 424—8 7 Claims

A lyophilized stable labeled antibody reagent that comprises a non-reducing polysaccharide, a normal serum and a labeled antibody, particularly an antibody labeled with a fluorescent chemical is provided that is exceptionally specific to a given antigen. Specificity is such that Group A, β-hemolytic Streptococci, can readily be identified in the presence of Group C or Group G Streptococci or *Staphlococcus aureus*. The reagent is stable in the lyophilized state at temperatures of up to 37°C. for a period of months and in the reconstituted state at 2° to 8° C. for a period of weeks.

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3,789,117

## PROCESS FOR THE PREPARATION OF ENTERIC MEDICAMENTS

Takuichi Tsujino, Tokyo, Japan, assignor to Freund Ind. Co., Ltd., Tokyo, Japan

Filed July 19, 1971, Ser. No. 164,115
Int. Cl. A01n 17/00; B44d 1/30; C08b 13/00
U.S. Cl. 424—35 7 Claims

An improved enteric coating for medicament less soluble in gastric juice or water is obtained by coating a medicament with an organic solvent-soluble cellulose derivative in which the hydrogen atom of one hydroxyl group has been substituted by a carboxymethyl group and at least one of other hydroxyl groups have been esterified or etherified.

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3,789,118

## MEDICAL ADHESIVE SOLVENT COMPOSITION

Arthur B. Broerman, 5901 Baylor, Bartlesville, Okla.

Filed July 16, 1971, Ser. No. 163,498
Int. Cl. B01f 1/00; C23g 5/00; A61k 9/00
U.S. Cl. 424—45 4 Claims

A solvent composition is provided which will efficiently remove medical adhesives, particularly adhesives containing silicone resins, from skin and simultaneously replace body oils, and prepare the skin to receive subsequent applications of the adhesive. The solvent composition comprises a major effective amount of a liquid aliphatic hydrocarbon solvent fraction, preferably a $C_8$ to $C_{11}$ aliphatic hydrocarbon fraction, a minor effective skin conditioning amount (generally comprising at least about 2 weight percent) of silicone fluid, and preferably, a minor effective amount of a flash point suppressant for the liquid aliphatic hydrocarbon fraction.

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3,789,119

## STABILIZED MOLDED SUBLINGUAL NITROGLYCERIN TABLETS

Salvatore A. Fusari, St. Clair Shores, and Leslie M. Lueck, Oxford, both of Mich., assignors to Parke, Davis & Company, Detroit, Mich.

Filed June 1, 1971, Ser. No. 149,072
Int. Cl. A61k 27/12
U.S. Cl. 424—78 4 Claims

Pharmaceutical compositions containing minor proportions of nitroglycerin and a non-volatile, water-soluble solvent in combination with a major proportion of a solid, water-soluble pharmaceutical carrier. Those compositions, in the form of tablets suitable for sublingual administration, can be produced by wetting a substantially dry mixture of the nitroglycerin and the solid, water-soluble pharmaceutical carrier with a solvent mixture containing a non-volatile, water-soluble solvent and a volatile solvent, forming the wetted mixture into tablets, and removing the volatile solvent.

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3,789,120

## SULFAMOYL AZIDE PROCESS AND COMPOSITION FOR LOWERING BLOOD PRESSURE

William L. Matier, and William T. Comer, both of Evansville, Ind., assignors to Mead Johnson & Company, Evansville, Ind.

Division of Ser. No. 16,933, March 5, 1970, Pat. No. 3,723,627. This application Jan. 8, 1973, Ser. No. 321,872
Int. Cl. A61k 27/00
U.S. Cl. 424—226 4 Claims

This invention is concerned with a pharmaceutical process and pharmaceutical compositions for lowering blood pressure in mammals by the administration thereto sulfamoyl azides of the Formula $R^1R^2NSO_2N_3$ and pharmaceutical compositions thereof. $R^1$ is alkyl, cycloalkyl, aryl, aralkyl and so on; $R^2$ is hydrogen, alkyl, cycloalkyl, phenyl, phenylalkyl, and so on; $R^1$ and $R^2$ can be taken together with nitrogen to form a heterocyclic radical.

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3,789,121

## 17α,21-ORTHOBUTYRATES OF 6α, 9α-DIFLUOROHYDROCORTISONE AND 6α, 9α-DIFLUOROPREDNISOLONE, COMPOSITIONS CONTAINING SAME AND THE USE THEREOF AS ANTI-INFLAMMATORY AGENTS

Alberto Ercoli, Milan, and Rinaldo Gardi, Carate Brianza, both of Italy, assignors to Warner-Lambert Company, Morris Plains, N.J.

Division of Ser. No. 55,260, July 15, 1970, which was a continuation-in-part of Ser. No. 716,287, Mar. 27, 1968, both abandoned.
Filed Nov. 26, 1971, Ser. No. 202,686
Int. Cl. A61k 17/00
U.S. Cl. 424—241 15 Claims

There have been prepared the new 17α, 21-orthobutyrates of 6α, 9α-difluorohydrocortisone and 6α, 9α-difluoroprednisolone -difluoroprednisolone useful as anti-inflammatory agents. The compounds may be used in the form of pharmaceutical formulations in corticoid anti-inflammatory therapy.

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3,789,122

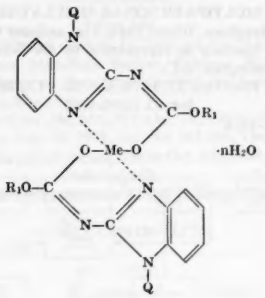
## FUNGICIDAL COMPOSITIONS OF TRANSITION METAL COMPLEXES OF SUBSTITUTED 2-BENZIMIDAZOLECARBAMIC ACID, ALKYL ESTERS

Hein L. Klopping, Wilmington, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 804,710, Mar. 5, 1969, Pat. No. 3,562,282, which is a continuation-in-part of Ser. No. 721,061, Apr. 12, 1968, abandoned, which is a continuation-in-part of Ser. No. 629,900, Apr. 11, 1967, abandoned, which is a continuation-in-part of Ser. No. 548,034, May 6, 1966, abandoned. This application Oct. 19, 1970, Ser. No. 82,120
Int. Cl. A01n 9/22
U.S. Cl. 424—245 15 Claims

Transition metal complexes of substituted 2-benzimidazolecarbamic acid, alkyl esters of the following formula are useful

as mite ovicides and fungicides:



where Q is $-\overset{O}{\overset{\|}{C}}-NHR_2$, $-\overset{O}{\overset{\|}{C}}-R_3$,

or $-SCCl_3$ and

$R_1$, $R_2$, $R_e$, $n$ and Me are as defined hereinafter. An exemplary species of the general class is the complex: 1-(butylcarbamoyl)-2-benzimidazolecarbamic acid, methyl ester 2:1 manganese complex.

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**3,789,123**

**TERTIARY AMINOACIDS AS ANTI-INFLAMMATORY AGENTS**

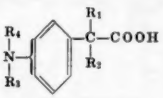
**Richard William James Carney, New Providence, and George De Stevens, Summit, both of N.J., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Continuation-in-part of Ser. No. 757,136, Sept. 3, 1968, Pat. No. 3,657,230, which is a continuation-in-part of Ser. No. 716,347, March 27, 1968, abandoned. This application Jan. 21, 1969, Ser. No. 792,755**

**Int. Cl. H61k** *27/00*

**U.S. Cl. 424—310** **2 Claims**

New $\alpha$-(tert. arylaminophenyl)-aliphatic acids, e.g. those of the formula



$R_1$ = H or alkyl

$R_2$ = H, alk(en)yl, cycloalk(en)yl or cycloalk(en)yl-alkyl

$R_3$ = alk(en)yl, hydroxyalkyl, alkoxyalkyl, aminoalkyl, cycloalk(en)yl or cycloalk(en)yl-alkyl

$R_4$ = aryl

and functional derivatives thereof, are anti-inflammatory agents.

**3,789,124**

**TREATMENT OF COLITIS ULCEROSA**

**Martin Kludas, Berlin, Germany, assignor to Heyl & Co., Chem.-Pharm. Fabrik, Berlin, Germany**

**Division of Ser. No. 81,626, Oct. 16, 1970. This application July 3, 1972, Ser. No. 268,675**

**Int. Cl. A61k** *27/00*

**U.S. Cl. 424—319** **5 Claims**

Colitis ulcerosa is treated according to the invention by administering to the patient suffering from such condition an effective dose of penicillamine. The preferred penicillamine because of its low toxicity is D-penicillamine. All types of administration are suitable, including oral administration and administration by injection. The actual dosage depends upon the extent of the condition. Orally the dose may be as little as 0.6 g per day and as high as 2.4 g per day, and even higher for short periods. By injection the dose may be as little as 0.5 g and as high as 1.5 g per day.

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**3,789,125**

**PHARMACEUTICAL COMPOSITIONS CONTAINING HALO-SUBSTITUTED 2-AMINO-BENZYLAMINE-AMIDES**

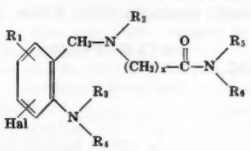
**Gerd Kuger, Biberach/Riss; Otmar Zipp, Osnabruck; Johannes Keck, Biberach/Riss; Josef Nickl, Biberach/Riss; Hans Machleidt, Biberach/Riss; Gerhard Ohnacker, Biberach/Riss; Robert Engelhorn, Biberach/Riss, and Sigfrid Puschmann, Biberach/Riss, all of Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany**

**Division of Ser. No. 89,058, Nov. 12, 1970, Pat. No. 3,712,924, which is a continuation-in-part of Ser. No. 872,778, Oct. 30, 1969, abandoned, which is a continuation-in-part of Ser. No. 555,696, June 7, 1966, abandoned. This application Oct. 24, 1972, Ser. No. 299,810**

**Int. Cl. A61k** *27/00*

**U.S. Cl. 424—324** **2 Claims**

Antitussive and respiration-stimulating pharmaceutical compositions containing as an active ingredient a compound of the formula



wherein

Hal is chlorine or bromine,

$R_1$ is hydrogen, chlorine or bromine,

$R_2$ is alkyl of one to four carbon atoms, allyl, phenyl, chlorophenyl, methoxyphenyl, carboxyphenyl, carbomethoxy-phenyl, tolyl, benzyl, methoxypropyl, cyclohexyl, phenethyl or dimethylaminopropyl,

$R_3$ and $R_4$ are each hydrogen, acetyl or benzoyl,

$R_5$ is hydrogen, alkyl of one to three carbon atoms or cyclohexyl,

$R_6$ is hydrogen, alkyl of one to three carbon atoms, hydroxyethyl, methoxypropyl, allyl, diethylaminoethyl, diethylamino-propyl, phenyl, fluorophenyl, benzyl or cyclohexyl, and

$n$ is 1, 2 or 3,

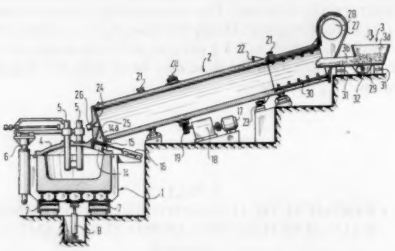
or a non-toxic, pharmacologically acceptable acid addition salt thereof; and a method of suppressing the cough reflex and stimulating the respiration in a warm-blooded animal therewith.

# ELECTRICAL

## 3,789,126
## ELECTRIC FURNACE FOR HEATING AND MELTING SCRAP IRON AND STEEL

**Ugo Brusa, Via Borgnis, Domodossola, Italy**

**Filed Dec. 20, 1972, Ser. No. 317,094**
**Claims priority, application Italy, Feb. 18, 1972, 67521/72**
**Int. Cl. F27d** *3/12, 13/00*
**U.S. Cl. 13—10** **5 Claims**

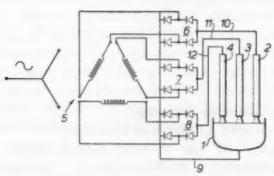


An electric furnace for heating and melting iron and steel scrap is provided having an inclined, rotatable cylinder into which batched quantities of scrap are fed, at the upper end thereof, from a hopper that is vibrated. Teeth in the cylinder control the flow of the scrap therethrough. Scrap is delivered from the lower end of the cylinder into a basin in which electrode means are positioned. The slag and melted metal are removed by tilting the basin. Slidable locks control the flow of flue gases and means for cooling the cylinder are also provided.

## 3,789,127
## ARC FURNACES

**Brian Bowman, Geneva, Switzerland, assignor to British Steel Corporation, London, England**

**Filed Jan. 5, 1973, Ser. No. 321,273**
**Claims priority, application Great Britain, Jan. 18, 1972, 2421/72**
**Int. Cl. F27d** *11/10*
**U.S. Cl. 13—12** **7 Claims**

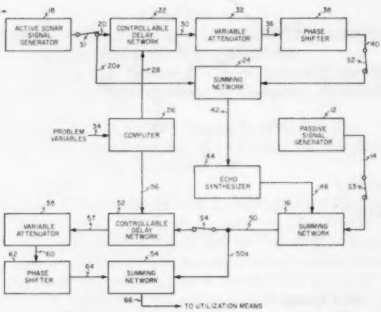


An electric arc furnace adapted to be powered by direct current includes a bottom electrode of one polarity (positive) mounted in the vessel for contact with the charge and three electrodes of negative polarity depending into the vessel from above. The arcs from the electrodes migrate inwardly which is the opposite of the case with a.c. thus reducing erosion of the furnace walls by concentrating the heat source in the centre. The bottom electrode design is such as to enable the furnace to be tapped whilst maintaining a reservoir of metal for the succeeding charge.

## 3,789,128
## MULTIPATH SONAR SIMULATOR

**Francis J. Murphree, Winter Park, Fla., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Feb. 22, 1971, Ser. No. 117,585**
**Int. Cl. G09b** *9/00*
**U.S. Cl. 35—10.4** **7 Claims**

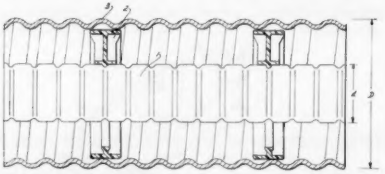



Part of the output of an active signal generator is delayed, phase shifted and recombined with the remainder of the output to form an input to an echo generator. Part of the output of a passive signal generator is likewise delayed, phase shifted and recombined with the passive signal generator output prior to being combined with the output of the echo synthesizer to provide signals simulative of multipath sonar characteristics. A controllable delay network utilizing shift register means is disclosed.

## 3,789,129
## AIR-INSULATED COAXIAL HIGH-FREQUENCY CABLE

**Hans Leo Ditscheid, Refrath, Germany, assignor to Felten & Guilleaume Aktiengesellschaft, Cologne-Mulheim, Germany**

**Filed June 4, 1973, Ser. No. 367,014**
**Claims priority, application Germany, June 6, 1972, 7221114**
**Int. Cl. H01b** *11/18*
**U.S. Cl. 174—28** **5 Claims**



A tubular inner conductor has a first diameter and is provided with annular corrugations adjacent ones of which are spaced from each other by a distance smaller than 0.3 times the first diameter. A coaxial tubular outer conductor surrounds the inner conductor and defines therewith a clearance. The outer conductor is provided with helical corrugations and has a larger second diameter. Spacers are located in the clearance and engage the corrugations of the inner and outer

conductors. Adjacent ones of these spacers are spaced axially of the conductors by a distance which is equal to between 0.6 and 0.75 times the sum of the first and second diameters.

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3,789,130

## TAMPER PROOF ELECTRICAL CABLES

**Herbert William Mansfield Parker, Zebbug; Malta, Great Britain, assignor to Pyrotenax Limited Hebburn-on-Tyne, Co., Durham, England**

**Continuation of Ser. No. 866,817, Oct. 16, 1969, abandoned. This application July 15, 1971, Ser. No. 163,060. The portion of the term of this patent subsequent to Oct. 10, 1989, has been disclaimed.**

**Claims priority, application Great Britain, Oct. 18, 1968, 49575/68**

**Int. Cl. H01b** *7/32*

**U.S. Cl. 174—113** **12 Claims**

An electric power or communication cable incorporates a mineral insulated cable of a cross-section that is small in comparison with the overall cross-section of the cable, a conductor or conductors of the mineral insulated cable being adapted to carry a signal other than the normal power or signalling load of the power or communication cable. Preferably the or each mineral insulated cable is so located in the cable that it is not easily recognised as an alarm circuit by a thief. In an electric power cable having armouring or a concentric screen or neutral conductor comprising wires applied as a continuous helical lapping or with periodically reversing lay one or more of the wires may be replaced by a mineral insulated cable.

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3,789,131

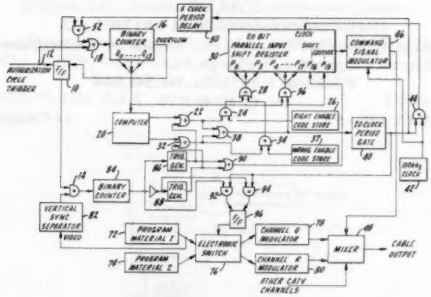
## SELECTIVE CODING SYSTEM FOR SUBSCRIPTION TELEVISION

**Ralph P. Harney, Wonder Lake, Ill., assignor to Oak Industries Inc., Crystal Lake, Ill.**

**Filed Aug. 3, 1972, Ser. No. 277,790**

**Int. Cl. H04n** *1/44*

**U.S. Cl. 178—5.1** **12 Claims**




A system for coding and decoding television signals in a subscription television system provides means for alternately switching a television signal between channels at a transmitting center and for providing channel switching signals simultaneously therewith to each subscriber location to coordinate channel switching at the subscriber locations. Prior to channel switching, those subscribers to receive the subscription program receive an enabling signal so that the chennel switching signals will only be effective to control channel switching at the selected subscriber locations.

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3,789,132

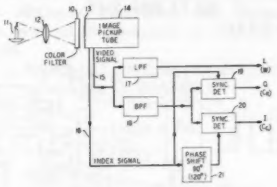
## COLOR CAMERA SYSTEM HAVING COMPLETE SPECTRAL CHARACTERISTICS

**Arthur Bertel Larsen, Colts Neck, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed May 19, 1972, Ser. No. 255,165**

**Int. Cl. H04n** *9/06*

**U.S. Cl. 178—5.4 ST** **7 Claims**




Improved color reproduction is made possible by a television camera exhibiting a complete predetermined camera spectral sensitivity characteristic having both the positive and negative lobes. Materials having transmission characteristics which are responsive to both the positive and inverted negative lobes of the predetermined characteristics are combined to form a single striped optical spatial filter at the camera, and the resultant composite video signal is demodulated to yield a chrominance output signal proportional to the difference between the light transmission provided by the filter stripes so that the prescribed spectral sensitivity characteristic is produced for each output channel. The technique permits a camera to exhibit complete spectral characteristics and to generate by direct optical means any color signal, including I or Q, and it is applicable to single or multiple tube cameras using spatial modulation techniques for color discrimination.

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3,789,133

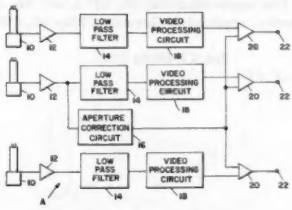
## TELEVISION CAMERA APERTURE CORRECTION SYSTEM

**Donald D. Kline, Palo Alto, Calif., assignor to Commercial Electronics, Inc., Mountain View, Calif.**

**Filed Oct. 26, 1971, Ser. No. 192,259**

**Int. Cl. H04n** *9/02*

**U.S. Cl. 178—5.4 R** **24 Claims**




A television camera aperture correction system wherein the video signal is applied to a low pass filter. The filtered video signal is substracted from the original video signal, which has been suitably delayed by a delay line to produce a contour signal containing primarily high frequency video signal components. The contour signal is amplified and the low level portion of the contour signal, which is primarily high frequency

noise, is removed by a coring circuit. Thereafter the cored contour signal is combined with the filtered video signal to produce a resultant video signal having enhanced high frequency components, but without the attendant high frequency noise increase conventionally associated therewith.

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**3,789,134**

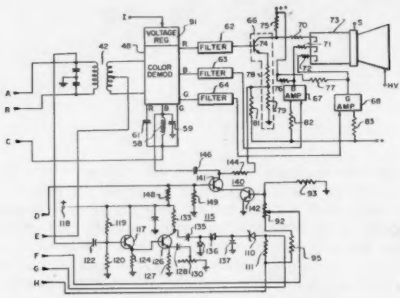
## PRESET CONTROL SYSTEM FOR A COLOR TELEVISION RECEIVER

**Thomas W. Ivas, Evergreen Park, and William H. Slavik, Palos Hills, both of Ill., assignors to Motorola Inc., Franklin Park, Ill.**

**Division of Ser. No. 140,489, May 5, 1971, abandoned. This application Oct. 19, 1972, Ser. No. 299,069**

**Int. Cl. H04r** *9/48*

**U.S. Cl. 178—5.4 AC** **4 Claims**




A color television receiver is provided with the customary manual controls for permitting a viewer to adjust brightness, contrast, saturation and hue of the image reproduced by the receiver. In addition, preset controls for brightness, contrast, hue and saturation are provided, and a push-button switch is used to select either the manual or preset controls to establish the characteristics of the reproduced image. With the push-button switch set to select the automatic or preset controls, an AND gate is enabled to cause a shift in the color demodulator angles and further to cause the relative gains of the final output amplifiers to be changed to enhance colors in the range of skin tones reproduced by the receiver.

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**3,789,135**

## OPTICAL SYSTEM FOR COLOR TELEVISION CAMERAS

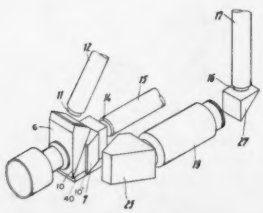
**Horst Bachmann, Darmstadt, Germany, assignor to Fernseh GmbH Darmstadt, Darmstadt, Germany**

**Continuation-in-part of Ser. No. 85,923, Nov. 2, 1970, abandoned. This application May 16, 1972, Ser. No. 253,814**

**Claims priority, application Germany, May 19, 1971, P 21 24 964.9**

**Int. Cl. H04n** *9/08*

**U.S. Cl. 178—5.4 E** **3 Claims**



An optical system for a color television camera comprises a beam-splitting arrangement for separating an incident light beam from a main objective lens into three partial beams corresponding respectively to three different parts of the visible spectrum, the three partial beams being supplied to the photoelectric cathodes of respective camera tubes. One of the partial beams is supplied to the respective photoelectric cathode by way of an intermediate lens, so that the size of the image on the photoelectric cathode is different from the size of the images on the other two photoelectric cathodes. A deflector is added to allow placement of the reduced image size camera tube perpendicular to the main objective lens.

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**3,789,136**

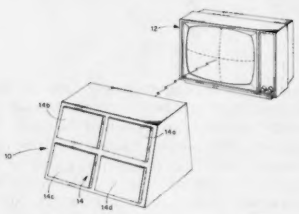
## ELECTRONIC SYSTEM FOR VIEWER RESPONSE TO TELEVISION PROGRAM STIMULI

**Marshall M. Haith, 2703 S. Macon, Aurora, Colo., and Robert A. Lentz, 138 Huron Ave., Cambridge, Mass.**

**Filed June 28, 1972, Ser. No. 267,083**

**Int. Cl. H04r** *7/00*

**U.S. Cl. 178—5.8 R** **9 Claims**



An electronic system for use with received educational television program material and operative to indicate the correct or incorrect nature of a viewer's response to presented visual stimuli, thereby creating a reinforcing and bilateral aspect to an educational television experience.

In a typical embodiment of the system, a console is provided having a display panel divided into segments which are spatially arranged to correspond to similarly arranged segments of an associated television screen on which stimuli are displayed. Each segment of the display panel is manually actuable, and actuation of a segment representing a correct response to presented stimuli causes a suitable output indication of such correct response.

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**3,789,137**

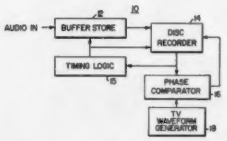
## TIME COMPRESSION OF AUDIO SIGNALS

**George F. Newell, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Apr. 7, 1972, Ser. No. 241,944**

**Int. Cl. H04n** *5/76*

**U.S. Cl. 178—6.6** **14 Claims**




The invention pertains to a technique for time-compressing audio signals without disturbing the relative position of the audio samples through the use of a time buffer store and a subsequent FM recording of the time-compressed audio signal in a format similar to video signals and the subsequent demodulation of the FM signals and time expansion of the signals to produce the original audio signals. The use of FM modulation

and demodulation of a type similar to that used with video information for recording and transmitting time-compressed audio information permits common processing of audio and video information and the utilization of standard video transmission and video tape and video disc recorders to accommodate audio as well as video information.

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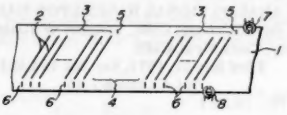
**3,789,138**

## DEVICE FOR GAINING RANDOM ACCESS TO VIDEO SIGNAL INFORMATION FOR USE IN VIDEO TAPE RECORDERS

**Toshimichi Terada, Hachioji-shi, Japan, assignor to Hitachi, Ltd., Tokyo, Japan**

**Filed June 18, 1971, Ser. No. 154,562**
**Claims priority, application Japan, June 23, 1970, 45-54626**
**Int. Cl. H04n** *5/78*
**U.S. Cl. 178—6.6 A** **5 Claims**



In a video tape recorder for recording video signal information of television scenes, pictures and various documents frame by frame on one or more tracks on a magnetic tape and selectively reproducing a desired video signal, a means for gaining random access to the desired video signal. The video signal information is recorded in blocks each consisting of many tracks noted above and each being spaced from another to define a blank portion without any information recorded between adjacent blocks. In addition to the video signal information, block identifying signals are recorded on the magnetic tape. For the reproduction of a desired static picture, random access to the desired frame is made by first running the magnetic tape by a fast feed or fast rewind drive until a block including the desired track or tracks is detected from the block identifying signals and then by feeding the tape either intermittently or continuously at a low speed until the position of the track of the desired frame is reached.

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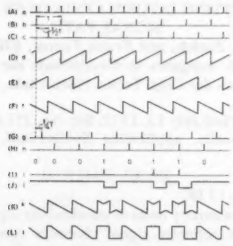
**3,789,139**

## SYSTEM FOR RECORDING AND REPRODUCING DIGITAL SIGNALS

**Kazuo Negishi, Yokohama, Japan, assignor to Victor Company of Japan, Ltd., Yokohama-City, Kanagawa-ken, Japan**

**Filed Oct. 3, 1972, Ser. No. 294,539**
**Claims priority, application Japan, Oct. 4, 1971, 46/77704; Oct. 4, 1971, 46/77705**
**Int. Cl. G11b** *5/06, 27/30;* **H04n** *5/78*
**U.S. Cl. 178—6.6 A** **8 Claims**



A digital signal recording system carries out the operational steps of gating respectively sawtooth waves in response to two digital signals of a pulse train of constant period and data pulses constituted by the presence or absence of pulses in accordance with data, mixing the sawtooth waves thus gated, and recording the waves thus mixed as a composite sawtooth wave on a recording medium. The positions of rise and fall of the composite sawtooth wave respectively correspond to the above mentioned two digital signals. A digital signal reproducing system carries out the steps of reproducing signals recorded by the above described recording system, separating the pulses of constant perios and the data pulses through the utilization of the characteristics of the signal pulses thus reproduced, and deriving two digital signals.

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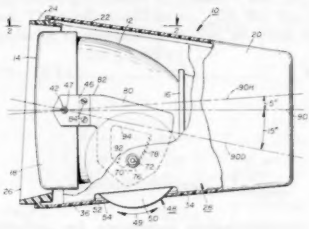
**3,789,140**

## TILTABLE DISPLAY SCREEN ASSEMBLY

**Edwin D. McQueen, Barrington, and Thomas L. Spicer, Chicago, both of Ill., assignors to Teletype Corporation, Skokie, Ill.**

**Filed July 3, 1972, Ser. No. 268,235**
**Int. Cl. H04n** *5/655*
**U.S. Cl. 178—7.81** **8 Claims**



A chassis is secured to the cabinet of television apparatus for manually tilting the primary image screen of the tube about a horizontal first axis disposed slightly behind the screen. Manual torque is applied by a hand wheel exposed through the cabinet and chassis and rockable about a second axis parallel to and behind the first axis. For torque transfer, a pinion rockable about the second axis with said hand wheel is enmeshed with a concave gear rack which is concentric with said first axis and has a radius of curvature larger than said pinion.

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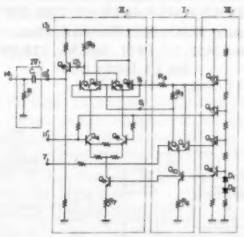
**3,789,141**

## BURST AMPLIFIERS FOR COLOR TELEVISION RECEIVERS

**Susumu Ayaki, and Masaru Shimano, both of Yokohama, Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Apr. 25, 1972, Ser. No. 247,338**
**Claims priority, application Japan, Apr. 30, 1971, 46/27965**
**Int. Cl. H04n** *9/44*
**U.S. Cl. 178—69.5 CB** **2 Claims**



An amplifier used for extracting a color burst signal from the chrominance signal in color television receivers, which in-

cludes no resonant-circuit but comprises three pairs of transistors and which is especially suitable for fabrication in the form of an integrated circuit.

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**3,789,142**

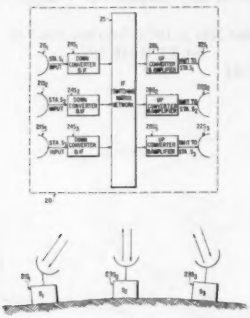
## FRAME SYNCHRONIZATION TECHNIQUE FOR SATELLITE ON-BOARD SWITCHING SYSTEMS

**Nobuhiko Shimasaki, Rockville, and Robert Rapuano, Gaithersburg, both of Md., assignors to Communications Satellite Corporation, Washington, D.C.**

**Continuation-in-part of Ser. No. 74,654, Sept. 23, 1970, abandoned. This application Mar. 26, 1971, Ser. No. 128,396**

**Int. Cl. H04j** *3/06*

**U.S. Cl. 179—15 BS** **8 Claims**



Frame synchronization techniques for communications satellite systems employing spot-beam antennas and satellite on-board switching. An on-board switching matrix provides, as part of its switching processes, a common loop-closure time slot. In one technique, during the common loop-closure time slot, the on-board switching matrix connects on-board receive spot-beam antennas with each respective earth station in the system to the corresponding on-board transmit spot-beam antennas associated with each respective earth station. Each earth station transmits a synchronization unique word followed by information bursts. If each earth station receives a predetermined portion of its sync unique word via the loop circuit mode during the loop-closure time slot then the subsequent frame of bursts of information transmitted by each earth station is in proper frame synchronization for distribution of the information by the switching matrix. In a second technique wherein each on-board spot-beam illuminates a respective zone comprising several earth stations frame synchronization is provided amongst the several zones.

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**3,789,143**

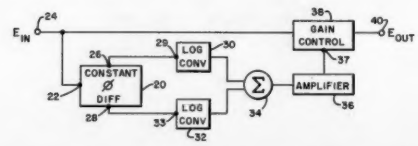
## COMPANDER WITH CONTROL SIGNAL LOGARITHMICALLY RELATED TO THE INSTANTANEOUS RMS VALUE OF THE INPUT SIGNAL

**David E. Blackmer, Bolton Rd., Harvard, Mass.**

**Filed Mar. 29, 1971, Ser. No. 128,892**

**Int. Cl. H04b** *3/04*

**U.S. Cl. 179—15.55 R** **12 Claims**




A compander system for audio signal processing, in which two 90° phase separated signals are generated from an input audio signal. Each phase separated signal is processed through a converter which provides an output signal logarithmically related to the instantaneous rms value of the corresponding phase separated signal. The output currents from both converters are proportional to the square of the input currents, hence are summed to yield a virtually ripple free output. This summed output is then scaled and applied to control the gain of a variable gain amplifier which either compresses or expands the original input audio signal according to the gain of the latter amplifier. Thus, the expansion or compression is a continuous linear process proportioned to the rms value of the input audio signal.

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**3,789,144**

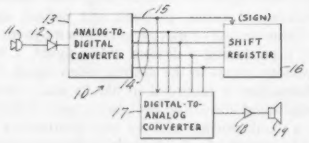
## METHOD FOR COMPRESSING AND SYNTHESIZING A CYCLIC ANALOG SIGNAL BASED UPON HALF CYCLES

**James H. Doyle, Orange, Calif., assignor to Master Specialties Company, Costa Mesa, Calif.**

**Filed July 21, 1971, Ser. No. 164,683**

**Int. Cl. H04b** *1/66*

**U.S. Cl. 179—15.55 T** **12 Claims**




An improved method for compressing a cyclic analog signal in which adjacent positive and negative half cycles are similar, such as an audio signal, and for reconstructing or synthesizing a new analog signal from the compressed signal. The original signal is compressed by removing one of the positive or the negative half cycles and, in a preferred embodiment, digitizing the remaining half cycles. The new analog signal is generated by sequentially applying each half cycle to an output and simultaneously storing such applied half cycle in a memory. After a half cycle is applied to the output and prior to applying the next half cycle in the sequence, the stored half cycle is applied to the output at a reversed polarity to simulate the portion which was originally removed.

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**3,789,145**

## METHOD, AND APPLICATION THEREOF, FOR TRANSMITTING INFORMATION OVER A COMMON SIGNAL PATH

**Arvind Shah, Zurich, and Frank Furrer, Effretikon, both of Switzerland, assignors to Gesellschaft zur Froderung der Forschung an der Eidg. Techn. Hochschule, Zurich, Switzerland**

**Filed July 13, 1972, Ser. No. 271,623**

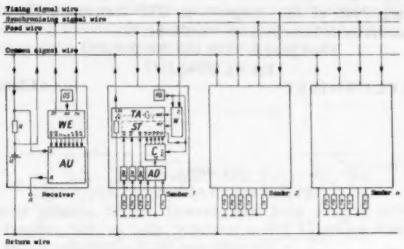
**Claims priority, application Switzerland, Oct. 5, 1971, 14490/71**

**Int. Cl. H04j** *3/00*

**U.S. Cl. 179—15 BC** **30 Claims**

A method whereby units of information supplied simultaneously over n separate signal channels can be transmitted simultaneously over a common signal path with the aid of n carrier signals, each associated with one of the signal channels, the units of information being impressed on such carriers. The carrier signals consist of n different functions $F_1(t)$ to $F_n(t)$ which are orthonormal to each other. Each function is

repeated at the expiration of a cycle beginning at the same instant $t_o+kT$ for all said functions and having the same duration




T and which, for any index values $\mu$ and $\nu$ lying between $l$ and $n$ for any positive integer values $k$, fulfill the condition

$$\frac{1}{T}\int_{t_o+kT}^{t_o+(k+1)T} F_\mu(t)\cdot F_\nu(t)\,dt = \begin{cases} 0 & \text{for } \mu \neq \nu \\ \text{const.} & \text{for } \mu = \nu. \end{cases}$$

The carrier signals are superposed on a common signal path so that a summation signal $S(t)$ is formed and transmitted over the common signal path. The units of information on any $m^{th}$ signal channel and incorporated in the summation signal are filtered out again, after a transmission of duration $\Delta t_m$, with the assistance of the integration

$$\frac{1}{T}\int_{t_o+kT+\Delta t_m}^{t_o+(k+1)T+\Delta t_m} S(t-\Delta t_m)\cdot F_m(t-\Delta t_m)\,dt$$

by synchronous correlation between a time shifted summation signal and a time function in period synchrony with such summation signal and corresponding to the carrier signal with the $m^{th}$ signal channel.

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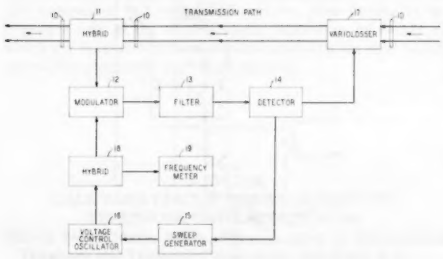
**3,789,146**

## OVERLOAD MONITOR FOR TRANSMISSION SYSTEMS

**Norman Lionel Major, Plaistow, N.H., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Nov. 20, 1972, Ser. No. 308,150**
**Int. Cl. H04j 1//16**
**U.S. Cl. 179—15 BF** **8 Claims**




A group of frequency division multiplexed signal channels is modulated by a swept frequency signal and the resultant modulated wave is delivered to a band-pass filter which serves to pass a narrow band of frequencies. In this manner the narrow band of the filter is effectively swept over the group of frequency multiplexed channels. A power detector monitors the filter output and if the same exceeds a given threshold level the sweep is interrupted and the narrow "slot" of the filter is caused to oscillate about the frequency of the detected power overload. After a short delay, loss is increasingly inserted into the transmission path until the overload is reduced to an acceptable level. The oscillation of the filter slot about the overload continues throughout this period of loss insertion, but in ever decreasing cycles (i.e., a homing operation is effected). When the overload is reduced to an acceptable level the homing operation is terminated and the sweep over said group of multiplexed channels thence proceeds.

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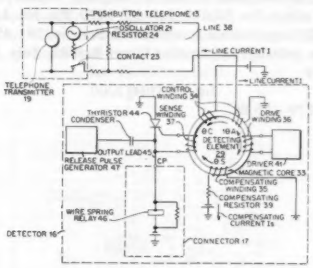
**3,789,147**

## TELEPHONE EXCHANGE EQUIPMENT CONDITION CHANGE DETECTING APPARATUS

**Yoshihiro Saito, Yokohama; Tomoo Okada, Kawasaki; Eiichi Odera, Kunitachi, and Teruyuki Matsuzawa, Kawasaki, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan**

**Continuation-in-part of Ser. No. 888,277, Dec. 29, 1969, abandoned. This application Mar. 8, 1972, Ser. No. 232,924**
**Claims priority, application Japan, Dec. 28, 1968, 43-187**
**Int. Cl. H04q 3/24**
**U.S. Cl. 179—18 FA** **11 Claims**




Condition change detecting apparatus detects the change of condition of an operation peripheral device by a variation in direct current flowing through a line. The change detecting apparatus has a condition detecting element and an impedance element equivalent to the value of impedance difference caused by the operation of the peripheral device. The condition detecting element comprises a magnetic core, a control winding on the core for detecting the line current, a compensating winding on the core for producing a magnetic field in a direction which negates the magnetic field produced by the control winding, a drive winding on the core and a sense winding on the core. The impedance element is connected in the line and the magnitude of current supplied to the compensating winding is determined by scanning means. The impedance element is then disconnected from the line.

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**3,789,148**

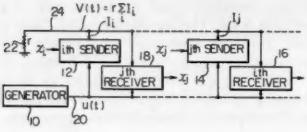
## MULTIPLEX TRANSMISSION METHOD

**Yasushi Ishii, Tokyo, Japan, assignor to Nissan Motor Company, Yokohama City, Japan; a part interest**

**Filed Feb. 3, 1971, Ser. No. 112,159**
**Claims priority, application Japan, Feb. 18, 1970, 45-13431; June 10, 1970, 45-49484**
**Int. Cl. H04j 3/08**
**U.S. Cl. 179—15 AL** **14 Claims**

A multiplex transmission method using a plurality of carrier signals each of which is not correlated with one another. The carrier signals are derived from e.g., an irregular signal. Each of the carrier signals is modulated with an information signal

by multiplying the former with the latter. Thereafter, the thus modulated carrier signals are demodulated by cross-correlating the sum of the modulated carrier signals and each of the




original carrier signals, which is equal to the average energy of the product over one period, thereby to reproduce the information signal.

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**3,789,149**

## CODE DIVISION MULTIPLEX SYSTEM

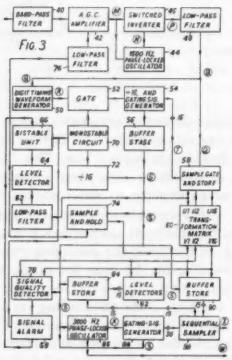
**Adrian Percy Clark, Taplow, England, assignor to Plessey Telecommunications Research Company, Taplow, England**

**Division of Ser. No. 58,620, July 27, 1970, Pat. No. 3,688,048. This application June 9, 1972, Ser. No. 261,454**

**Claims priority, application Great Britain, July 30, 1969, 38273/69**

**Int. Cl. H04j** *3/00*

**U.S. Cl. 179—15 BC** **4 Claims**




In digital transmission systems for use over H.F. radio links, the effects of multi-path propagation can be reduced by limiting the minimum duration of a signal element. The invention is concerned with a system for use when a transmission rate much greater than that which can be accommodated on a single channel if this minimum element duration is maintained. A code-division multiplex system is used. A first plurality of multi-level signals each represents a plurality of elements of the incoming signal. An orthogonal transformation matrix produces a second plurality of multi-level signals, the level of each of which is dependent on all said first plurality of multi-level signals. A time-division-multiplex signal is then produced from said second plurality of multi-level signals and used to modulate a carrier signal.

**3,789,150**

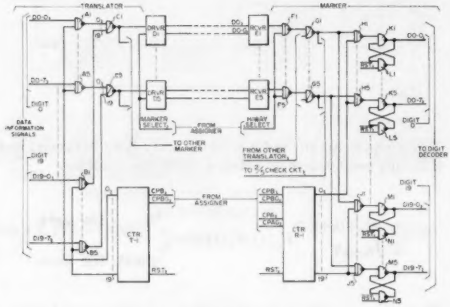
## SUBSYSTEM DATA TRANSFER IN A TELEPHONE SYSTEM

**Melvin A. Jacobs, Hinsdale, and John W. Woodward, Schaumburg, both of Ill., assignors to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.**

**Filed June 8, 1972, Ser. No. 260,952**

**Int. Cl. H04q** *3/47*

**U.S. Cl. 179—18 ET** **6 Claims**




An arrangement for transferring data between a translator and marker in a crosspoint switching system, where both translator and marker each contain internal clocks and operate asynchronously to each other. Data transfer is accomplished under control of clock pulses from a source external to both marker and translator.

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**3,789,151**

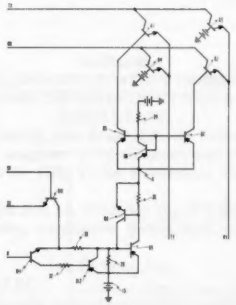
## SOLID STATE CROSSPOINT SWITCH

**Glenn L. Richards, Caledonia, N.Y., assignor to Stromberg-Carlson Corporation, Rochester, N.Y.**

**Filed Mar. 6, 1972, Ser. No. 232,031**

**Int. Cl. H04q** *3/50*

**U.S. Cl. 179—18 GF** **10 Claims**



A solid state crosspoint switch particularly suited for use in a telephone switching matrix utilizes two switching transistors and two compensating transistors in a balanced bridge con-

figuration to substantially eliminate crosstalk while the switch is effectively open (all four transistors cut off to provide a high impedance for blocking the passage of audio signals therethrough). Audio signals are enabled to pass through the crosspoint switch via a low impedance path by driving the two switching transistors into saturation from a gated control circuit responsive to appropriate control signals.

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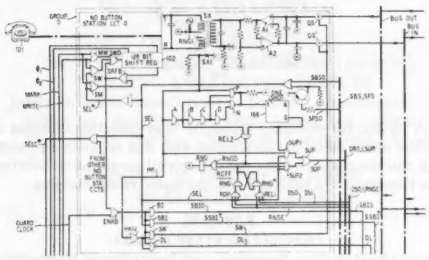
**3,789,152**
**DATA FORMAT CONVERTER**
**David Gordon Medill, Denver, and John Francis O'Neill, Boulder, both of Colo., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**
**Filed Dec. 11, 1972, Ser. No. 313,952**
**Int. Cl. H04m** *1/00*
**U.S. Cl. 179—99** **9 Claims**



An electronic key telephone system is disclosed in which both conventional telephone sets as well as electronic key telephone sets are served. The electronic telephone sets transmit switchhook status and receive ringing control information over a data link to a main controller but the conventional telephone sets must receive ringing signals over the talking path. While it is expected that most sets will be of the electronic type, a few conventional sets will likely have to be served in many practical installations. In order that the main controller be able to process network connections for both types of telephone sets without having to be reprogrammed when the distribution of telephone set types is changed, an interface circuit is provided for use with the conventional, no-button sets. This interface circuit receives supervision information from the port circuit serving the no-button station set and transmits it as a compelled response pulse during an appropriate one of the multibit pulse sequences by means of which the main controller communicates with the port circuit serving the electronic key telephone sets.

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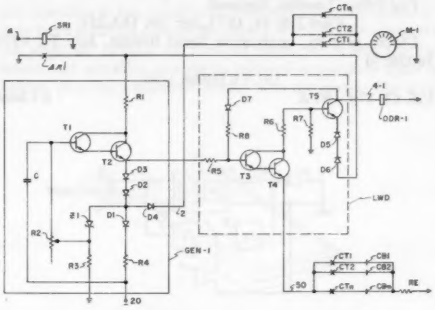
**3,789,153**
**CALL PARK CIRCUIT FOR AN AUTOMATIC TELEPHONE SWITCHING SYSTEM**
**Marvin Forest Malm, Milan, Tenn., assignor to International Telephone and Telegraph Corporation, New York, N.Y.**
**Filed June 8, 1972, Ser. No. 260,846**
**Int. Cl. H04q** *3/64*
**U.S. Cl. 179—27 D** **10 Claims**

In a telephone switching system in which automatic operator access is provided, a further system is provided to assure that incoming calls to an operator are treated on a first-come first-serve basis during periods of heavy traffic in which the operators are busy. This further system is minimized in size, in



cost and in complexity according to the present invention through use of circuits which complete a single call when an operator becomes available.

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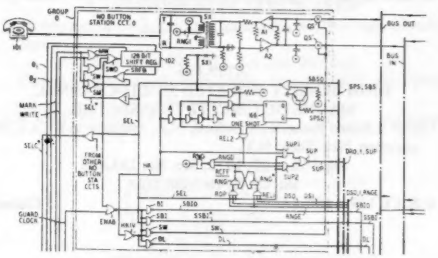
**3,789,154**
**SWITCHHOOK STATUS SIGNALING ARRANGEMENT**
**David Gordon Medill, Denver, Colo., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**
**Filed Dec. 11, 1972, Ser. No. 313,955**
**Int. Cl. H04m** *1/00*
**U.S. Cl. 179—99** **7 Claims**



An electronic key telephone system is disclosed in which both conventional telephone sets as well as electronic key telephone sets are served. The electronic telephone sets transmit call signaling to and receive ringing control information from a main controller over a data link independent of the speech path but the conventional telephone sets must both transmit dial pulses and receive ringing signals over the talking path. A line transformer relay is used with both sets to repeat supervision. The conventional ringing signal, however, causes the line transformer relay to generate an erroneous switchhook state signal. In order to compensate for this erroneous response without requiring the reprogramming of the main controller each time the number of conventional and electronic key telephone sets served by the system is changed, a logic circuit inhibits the return of the station's switchhook state ascertained by the line transformer relay for a predetermined interval after each cycle of ringing and causes an on-hook signal to be returned. When ringing is tripped, the same supervision logic in the interface circuit inhibits the return of switchhook state information ascertained by the line transformer relay for an interval longer than the maximum loop-open interval that can occur during normal dialing and instead causes an off-hook signal to be returned.

3,789,155

## SIDE-TONE REDUCING CIRCUIT FOR A TELEPHONE SUBSCRIBERS INSTRUMENT

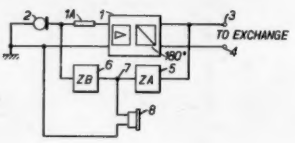
Harry William Fensom, Stanmore, England, assignor to The Post Office, London, England

Filed July 16, 1971, Ser. No. 163,251

Claims priority, application Great Britain, July 24, 1970, 36020/70

Int. Cl. H04m *1/58*

U.S. Cl. 179—81 A 6 Claims




A circuit for a telephone subscriber's instrument is described including a transistor amplifier in grounded emitter connection for amplifying signals from the transmitter and applying them to the exchange line. A tapped negative feedback path over the amplifier is provided and a receiver is connected to the tapping so that little sidetone from the transmitter is heard, but signals from the exchange line are not greatly attenuated. A zener diode in the emitter circuit of the transistor can be used to produce supply voltage for transmitter and receiver amplifiers. The transmitter amplifier may be provided with a positive feedback path which is effective when the handset is replaced on the cradle so that the transmitter generates an audible signal in response to a calling tone from the exchange.

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3,789,156

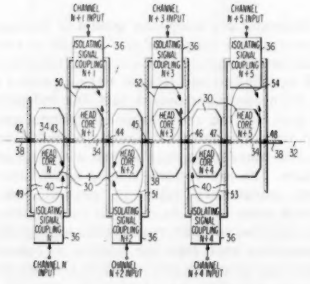
## HIGH DENSITY ISOLATED MULTI-CHANNEL MAGNETIC CIRCUIT TRANSDUCER

Oliver Edward Bessette, Stratford, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Mar. 27, 1972, Ser. No. 238,485

Int. Cl. G11b *5/20, 5/28*

U.S. Cl. 179—100.2 C 5 Claims




An arrangement is disclosed for minimizing cross talk between adjacent transducer elements in a compact multi-element transducer assembly. This is accomplished by provision of a multi-element transducer assembly structure wherein common impedance connections for energizing adjacent transducer elements are avoided.

3,789,157

## SHIELDING DEVICE FOR OVERLAPPING THE FRONT FACE OF A MAGNETIC HEAD IN MAGNETIC TAPE CARTRIDGES OF THE COMPACT CASSETTE TYPE

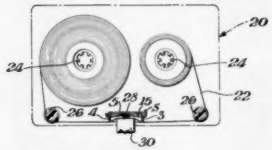
Joachim Greiner, Perutz Photowerke ZN der Agfa-Gevaert AG. Kistlerhofstr. 75; Dieter Engelsmann, Agfa-Gevaert AG Camera - Werk, Postfach D-8000; Josef Gersch, Agfa-Gevaert AG Camera-Werk, Postfach D-8000; Franz Landbrecht, Agfa-Gevaert AG Camera-Werk, Postfach D-8000; Rudolf Muller, Agfa-Gevaert AG Camera-Werk, Postfach D-8000; Wolfgang Wenger, Agfa-Gevaert AG Camera-Werk, Postfach D-8000, and Otto Wiedemann, Agfa-Gevaert AG Camera-Werk, Postfach D-8000, all of Munich, Germany

Filed July 19, 1971, Ser. No. 163,605

Claims priority, application Germany, July 24, 1970, 2036754

Int. Cl. G11b *23/08*

U.S. Cl. 179—100.2 Z 11 Claims




A device for shielding magnetic tape cassettes includes a hollow sheet metal parallelepiped with side recesses and with the shielding walls of the parallelepiped arranged to overlap the front face of a head and also the sound head shielding.

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3,789,158

## DEPOSITED STRIP HEADS

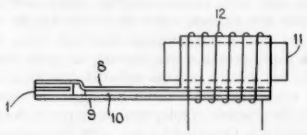
Peter Albert Walker, Stevenage, and Justus Ernest Humpoletz, Letchworth, both of England, assignors to International Computers Limited, London, England

Filed Nov. 1, 1971, Ser. No. 194,181

Claims priority, application Great Britain, Nov. 7, 1970, 53059/70

Int. Cl. G11b *5/12*

U.S. Cl. 179—100.2 C 3 Claims




A magnetic recording head including a composite element formed by a inner layer of conductive material sandwiched between two layers of readily magnetisable material. A conductive outer layer is disposed over at least a portion of each magnetisable layer, these outer layers being electrically interconnected solely by the inner conductive layer.

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3,789,159

## ARRANGEMENT FOR SYNCHRONIZING THE RECORDING OF A PLURALITY OF SIGNALS ON A RECORDING MEDIUM

Louis Feit, Fair Lawn, and Irving A. Krause, Nutley, both of N.J., assignors to International Telephone and Telegraph Corporation, Nutley, N.J.

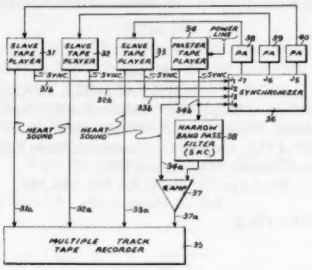
Filed May 23, 1972, Ser. No. 256,033

Int. Cl. G11b *5/86, 15/18*

U.S. Cl. 179—100.2 S 12 Claims

An arrangement for synchronized recording is described for recording of a plurality of aural sounds in a predetermined

time relationship. The arrangement includes a master tape player and a plurality of slave tape players which are controlled by a synchronizer so that they are individually advanced or retarded in accordance with a synchronizing signal from the master player. This enables the production of a single tape with each desired aural sounds on one of the multiple tracks of the tape in proper synchronized relationship.

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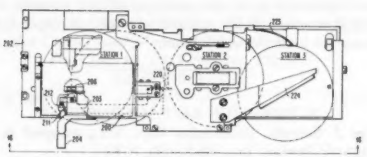
**3,789,160**

**DICTATION APPARATUS WITH DISC LOADING, FEEDING, AND EJECTING FEATURE**

**James D. Bruer, Leander, Tex.; Donald L. Buddington, Versailles, Ky., and Walter F. Klein, Austin, Tex., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Dec. 20, 1971, Ser. No. 209,800**
**Int. Cl. G11b** *23/04, 25/04*
**U.S. Cl. 179—100.2 Z** **23 Claims**



The present invention concerns dictation and transcription apparatus having convenient and efficient structures for loading, feeding, and ejecting disc record members. In exemplary embodiments, the disc record members are stored in a disc cartridge enabling convenient transportation and storage when not in use. Both dictation and transcription apparatus are provided with a load station, a record/playback station, and an eject (unload) station. Provision is made in the apparatus for accommodating any of a plurality of standard disc cartridges at the load station enabling convenient manual loading by an operator of the apparatus. Following the loading of discs into the apparatus, the cartridge is thereupon moved to the eject (unload) station and serves to receive the discs, one by one, as they are processed in the apparatus.

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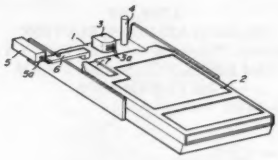
**3,789,161**

**AMPLIFIER CIRCUITRY FOR TWO-FOUR CHANNEL CARTRIDGE TYPE TAPE PLAYER**

**Yoshiro Mizumoto, Iwaki, Japan, assignor to Alps Motorola, Inc., Tokyo, Japan**

**Filed May 16, 1972, Ser. No. 253,780**
**Claims priority, application Japan, June 25, 1971, 46-55027**
**Int. Cl. G11b** *21/08, 23/04;* **H04h** *5/00*
**U.S. Cl. 179—100.2 Z** **6 Claims**

A two-four channel tape player including circuitry for switching the mode of operation thereof in accordance with a cartridge received in the player includes four amplifier circuits, each coupled to a magnetic pick-up of a four channel magnetic tape head and to a corresponding speaker. Each amplifier circuit is coupled to a rotary switch through a two-four channel mode selecting switch. The rotary switch is rotatable and operable to two conditions in response to the rotation of a tape head indexing cam of the player. First diodes coupled to the amplifier circuits are forward biased to couple the last-mentioned amplifier circuits to respective speakers upon insertion of a four channel cartridge into the player. For a two



channel cartridge, only two of the four pick-ups of the tape head and corresponding amplifier circuits are employed. The amplifier output of a first one of the operational channels is reproduced at a first pair of speakers and the amplified output of the second operational channel is reproduced at the other pair of speakers. Second diodes coupled between the rotary switch wiper and the inputs to the first diodes are provided. Pairs of the second diodes selected in accordance with the position of the rotary switch wiper, are reverse biased to block signals from respective amplifier circuits.

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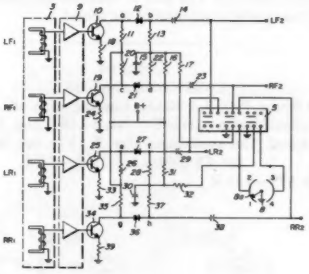
**3,789,162**

**TWO-FOUR CHANNEL CHANGEOVER CIRCUIT FOR A CARTRIDGE-TYPE TAPE PLAYER**

**Toru Miyazaki, 15-3 Aza Sakumae, Okaona, Onahama, Iwaki, Japan**

**Filed June 29, 1972, Ser. No. 267,563**
**Claims priority, application Japan, Aug. 13, 1971, 46-72482**
**Int. Cl. G11b** *5/54*
**U.S. Cl. 179—100.2 CA** **6 Claims**




A two-four channel tape player including circuitry for switching the mode of operation thereof in accordance with a cartridge received in the player includes four amplifier circuits, each coupled to a magnetic pick-up of a four-channel magnetic tape head and to a corresponding speaker. Each amplifier circuit is coupled to a rotary switch through a two-four channel mode selecting switch. The rotary switch is rotatable and operable to two conditions in response to the rotation of a tape head indexing cam of the player. Diodes coupled to the amplifier circuits are forward biased to couple the last-mentioned amplifier circuits to respective speakers upon insertion of a four-channel cartridge into the player. For a two-channel cartridge, only two of the four pick-ups of the tape head and

corresponding amplifier circuits are employed. The amplified output of a first one of the operational channels is reproduced at a first pair of speakers and the amplified output of the second operational channel is reproduced at the other pair of speakers. Resistive networks coupled between a potential source and the output of the diodes are provided. The resistive networks provide the biasing potential required at the cathodes of the diodes for forward and/or reverse biasing thereof in accordance with the type of cartridge inserted into the player for passing and/or blocking signals from respective amplifier circuits.

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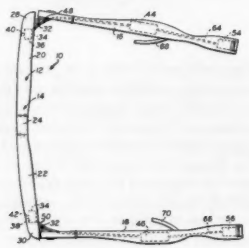
**3,789,163**
**HEARING AID CONSTRUCTION**
**Alfred R. Dunlavy, 77 Seventh Ave., New York, N.Y.**
**Filed July 31, 1972, Ser. No. 276,828**
**Int. Cl. G02c** *1/06*
**U.S. Cl. 179—107 S** **9 Claims**



A spectacle hearing aid construction comprising of a frame including a pair of eyeglass supports connected by a bridge and a pair of temple members hingedly connected thereto. A respective microphone is received in each support and converts sound vibrations into corresponding electric signals. A respective amplifying device in the frame is connected to each microphone for amplifying the electric signals and converting the signals to amplified sound vibrations. A respective sound applicator is connected to each amplifying device for applying the sound vibrations from the associated amplifying device to each ear of the user. The pair of microphones permits realization of the spacial resolution of the sound.

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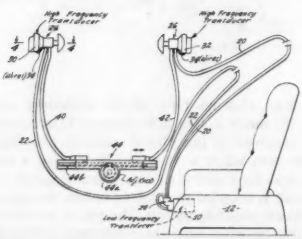
**3,789,164**
**EARPHONE ASSEMBLY**
**Robert Ryder, P.O. Box 90331, Los Angeles, Calif.**
**Continuation-in-part of Ser. No. 64,484, Aug. 17, 1970, abandoned. This application Mar. 3, 1972, Ser. No. 231,560**
**Int. Cl. H04m** *1/05*; **H04r** *5/00*
**U.S. Cl. 179—156 R** **6 Claims**



An earphone assembly is provided of the pneumatic type such as are presently used on aircraft, and which is constructed to improve the reproduction quality of the instrument by providing high frequency transducers directly at the ear pieces for producing high frequency sound signals which would otherwise be attenuated in the flexible plastic tubes coupling the ear pieces to the main electrical/acoustical transducer.

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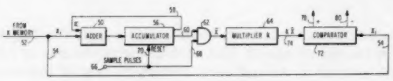
**3,789,165**
**ECHO CANCELLER WITH VARIABLE THRESHOLD**
**Samuel Joseph Campanella, Gaithersburg; Henri George Suyderhoud, Potomac, and Michael Onufry, Jr., Gaithersburg, all of Md., assignors to Communications Satellite Corporation (Comsat), Washington, D.C.**
**Filed Apr. 24, 1972, Ser. No. 246,785**
**Int. Cl. H04b** *3/22*
**U.S. Cl. 179—170.2** **4 Claims**



An echo canceller having a digital transversal filter with adjustable gain coefficients and an adaptive control loop for achieving minimum echo and similar speed of convergence for loud and soft talkers. Minimum echo is attained by subtracting a synthesized echo from the real echo, the synthesized echo being formed in a digital transversal filter by multiplying a stored replica of the impulse response times the incoming signal. The stored replica is updated using the steepest descent technique by adjusting each of the stages of the replica memory a given amount. Adjustment is made when the echo error and the sampled incoming signal are above respective threshold levels. The threshold level for the sampled signal is made dependent upon the average of the samples over a period of time to provide substantially the same speed of convergence for loud and soft talkers.

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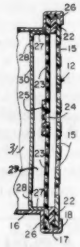
**3,789,166**
**SUBMERSION-SAFE MICROPHONE**
**George J. Sebesta, Huntington Bay, N.Y., assignor to Dyna Magnetic Devices, Inc., Hicksville, N.Y.**
**Filed Dec. 16, 1971, Ser. No. 208,630**
**Int. Cl. H04r** *1/02*
**U.S. Cl. 179—184** **6 Claims**



Air-conduction transducers such as microphones, earphones and loudspeakers for high humidity or high altitude environments. Further, the invention transducers are operable in up to a few feet of water. Also, when immersed to greater depths, as down to 100 feet at sea, means are incorporated therein to keep such transducers bone dry. A contained flexible barrier-diaphragm with a semi-pervious vent serves as

pressure flap valve below two or three feet. The invention arrangement permits operation of the transducer up to 10,000 feet in altitude, and keeps it safe up to 50,000 feet.

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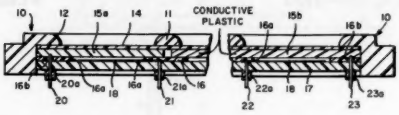
### 3,789,167
### MULTI-OUTPUT LEVEL KEYBOARD SWITCH ASSEMBLY WITH IMPROVED OPERATOR AND CONTACT STRUCTURE

**Richard E. Seeger, Jr., Topsfield, and John G. Coulter, Reading, both of Mass., assignors to Chomerics, Inc., Woburn, Mass.**

**Filed Dec. 20, 1972, Ser. No. 316,656**
**Int. Cl. H01h** *13/52*
**U.S. Cl. 200—5 A** **6 Claims**




A structure which includes a circuit board having a conductive pattern thereon and supporting a resilient conductive layer by way of an insulator layer having a plurality of windows therethrough in alignment with portions of the conductive pattern, the resilient layer divided into at least two sections held electrically apart by pins coupled to a frame member in which the board and layers are packaged.

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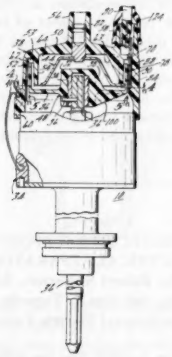
### 3,789,168
### IGNITION DISTRIBUTOR DEVICE WITH INSULATIVE SHUTTER TYPE ROTOR

**Earl W. Meyer, Jr., Birmingham; Ivor W. Carter, Detroit, and Ian J. C. Scott, Madison Heights, all of Mich., assignors to Chrysler Corporation, Highland Park, Mich.**

**Filed Jan. 10, 1973, Ser. No. 322,342**
**Int. Cl. H01h** *19/60*
**U.S. Cl. 200—19 R** **15 Claims**



An ignition distributor device for use with vehicle engine ignition systems equipped with electronically advanced spark timing angle controllers has a stationary high tension distribution electrode, a plurality of stationary output electrodes spaced from the distribution electrode, and a rotary dielectric shutter element disposed between the distribution electrode and the output electrodes. The shutter has a window therein dimensioned to permit conductive association of the distribution electrode with only one of the output electrodes at a time. The output electrodes are readily removable from and insertable in the distributor cap and also provide a cable termination for the ignition spark plug cables received in the cap.

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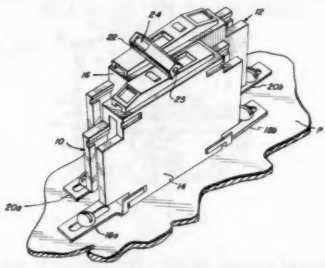
### 3,789,169
### HANDLE INTERLOCK ARRANGEMENT FOR A PAIR OF ELECTRIC CIRCUIT BREAKERS

**Thomas A. Yazvac, Cedar Rapids, Iowa, assignor to Square D. Company, Park Ridge, Ill.**

**Filed Oct. 12, 1972, Ser. No. 297,110**
**Int. Cl. H01h** *33/46*
**U.S. Cl. 200—50 C** **2 Claims**



Two manually-operable circuit breakers are mounted side by side in reversely positioned relationship and are staggered lengthwise to align the handles. The aligned handles are connected by a handle tie member to prevent both handles from being in the ON position simultaneously.

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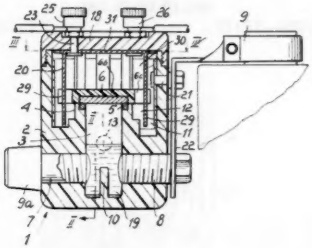
### 3,789,170
### CONDUCTING FLUID TYPE INERTIA RESPONSIVE SWITCH FOR MOTOR VEHICLES

**Franco Ferrario, Via Lombardia 1, Trezzo Sull Adda, Italy**

**Filed June 12, 1972, Ser. No. 263,716**
**Claims priority, application Italy, June 19, 1971, 26084/71; Sept. 7, 1971, 28341/71**
**Int. Cl. H01h** *35/14*
**U.S. Cl. 200—61.47** **3 Claims**



An antomatic cutout switch for motor vehicles, comprising a container of insulating material having a first compartment of vertical axis. A second compartment surrounding the first one is in communication with the first compartment. The first compartment has a pair of conductors at a certain distance apart from one another and being provided with terminals one of which is connected to a pole of an electric current source for the motor vehicle. The first compartment contains mercury normally in contact with the ends of said conductors which appear there so as to form the electrical contact between them.

3,789,171

## PRESSURE SWITCH WITH OPERATING LEVER HAVING MANUALLY ADJUSTABLE PRE-LOADING MEANS THEREFORE

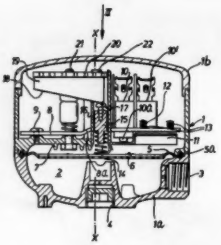
Graham B. Kent, Bristol, England, assignor to Actuated Controls Limited, Bristol, England

Filed Aug. 22, 1972, Ser. No. 282,781

Claims priority, application Great Britain, Aug. 24, 1971, 39534/71

Int. Cl. H01h *35/34*

U.S. Cl. 200—83 S 15 Claims



An improved pressure switch unit according to this invention has a movable diaphragm which is connected to a switch within a casing by a lever which has a resilient connection to a mounting element for the switch, so that pressure overloading of the diaphragm is accommodated by the resilient connection, avoiding undue stress on the switch itself or its operating lever. The switch unit is readily adaptable for use in low and high pressure ranges by using the switch mounting element either as a fixed mounting, with adjustment means acting directly on the diaphragm, or as a floating mounting which is positionally adjustable to adjust the sensitive pressure range of the unit.

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3,789,172

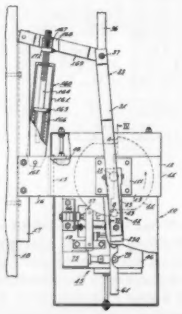
## SWITCH OPERATING DEVICE WITH SPIRAL SPRING CHARGING MEANS AND CAM RELEASE MEANS

David R. Cole, Tigard, and Matthew L. Worrix, Sheridan, both of Oreg., assignors to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Sept. 15, 1972, Ser. No. 289,745

Int. Cl. H01h *3/30*

U.S. Cl. 200—153 SC 6 Claims



An operating device is provided for actuating an electrical switch between an opened and closed condition. The operating device includes a stored energy means such as the spring which is releasable to rotate a shaft that is mechanically connected to open or close the switch. Recharging of the spring is effected by means of a gear motor which is also operable to hold the spring from reverse operation. Automatic means are provided for effecting the operation of the stored energy means.

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3,789,173

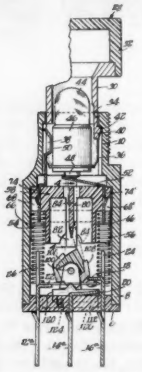
## ALTERNATE ACTION SWITCH CONVERTIBLE TO MOMENTARY BY PUTTING LATCH ON DIFFERENT PIVOT

George John Bury, Lake Villa, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Filed Dec. 7, 1972, Ser. No. 312,901

Int. Cl. H01h *13/60*

U.S. Cl. 200—153 J 9 Claims



A switch has movable contacts that are actuated by a rotatable ratchet that is operated by push button-driven pawl. The ratchet cooperates with a spring-biased, pivoted lever for providing alternate switch operation in which the ratchet is moved with a toggle action to either of two positions and latched thereat. The pivot axis of the lever may be optionally shifted so that the lever will apply force against the ratchet in a manner to bias it to only one position to provide a momentary switch operation. The pawl is integral with a carrier and is joined there to by torsion spring connections at which the pawl rotates upon its actuation of the ratchet.

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3,789,174

## EARTHQUAKE-PROTECTIVE SUPPORT SYSTEM FOR ELECTRICAL APPARATUS

Philip Barkan, Media; Robert S. Barton, Bryn Mawr; Klaus M. Skreiner, Media, and Ugo R. Tognella, Philadelphia, all of Pa., assignors to General Electric Company, New York, N.Y.

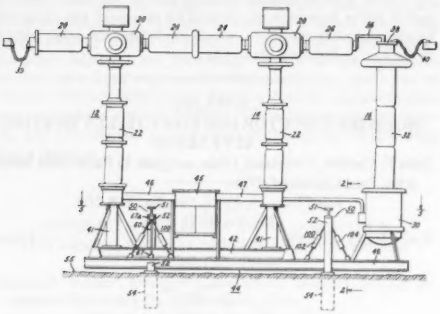
Filed Mar. 7, 1973, Ser. No. 339,025

Int. Cl. F16f *15/00*

U.S. Cl. 200—168 R 13 Claims

A support system for slender-profile electrical apparatus acts to protect the apparatus against severe earthquakes. The support system comprises: (a) a rigid, horizontally-extending platform on which the apparatus is mounted, (b) a rigid framework anchored in the ground, and (c) four rigid pendulum links with universal joints at opposite ends of each link suspending the platform from the framework. Releasable restraining means normally maintains the platform fixed rela-

tive to the framework but is released in response to horizontally-directed acceleration of the ground exceeding a



predetermined minimum value. Damping means dissipates the kinetic energy of the suspended mass when it moves relative to the framework.

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**3,789,175**

**ELECTRIC COMPRESSED-GAS CIRCUIT BREAKER**

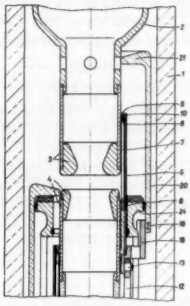
**Helmut Beier; Siegfried Handke, and Wolfgang Konczal, all of Berlin, Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany**

**Filed Feb. 22, 1973, Ser. No. 334,934**

**Claims priority, application Germany, Feb. 22, 1972, 2209287**

**Int. Cl. H01h** *33/82*

**U.S. Cl. 200—148 R** **7 Claims**



An electric compressed-gas circuit breaker is disclosed and has two stationary contact pieces. A switching unit is movable between closed and open positions for electrically bridging the contact pieces in the closed position and for electrically disconnecting the contact pieces in the open position whereby an arc develops when the switching unit is moved to the open position. A gas-blast arrangement blasts a stream of gas through the arc when the switching unit is moved to the open position. The switching unit includes a supporting body and a slide-contact ring made of arc-resistant material slideably contacting one of the contact pieces in the closed position. The ring is mounted on the supporting body so as to be electrically insulated therefrom. A plurality of elongated contact elements are disposed in the supporting body for electrically connecting the contact pieces when the switching unit is in the closed position. The contact elements are spring loaded to displace the same into electrically conductive contact with the slide-contact ring as the ring and the contact elements separate from the one contact piece when the switching unit moves into the open position.

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**3,789,176**

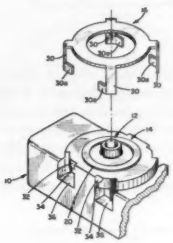
**DIAPHRAGM SEAL ARRANGEMENT**

**William Albert Pick, Cedarville, Ill., assignor to Honeywell, Inc., Minneapolis, Minn.**

**Filed Dec. 27, 1971, Ser. No. 212,027**

**Int. Cl. H10h** *9/04*

**U.S. Cl. 200—168 G** **4 Claims**



A diaphragm seal arrangement where a diaphragm seal is secured in place by a retainer that is snap fastened to a portion of the device with which the diaphragm seal is associated.

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**3,789,177**

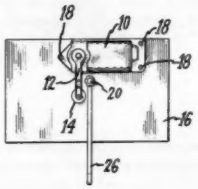
**ACTUATING MECHANISM FOR A LIMIT SWITCH HAVING ELONGATED PIVOTALLY MOUNTED ACTUATING MEMBER**

**Loyde M. Carpenter, Hickory; James W. Kiser, Iron Station, and Lee V. Leonard, Hickory, all of N.C., assignors to General Electric Company, Pittsfield, Mass.**

**Filed May 26, 1972, Ser. No. 257,291**

**Int. Cl. H01h** *3/16*

**U.S. Cl. 200—172 A** **3 Claims**



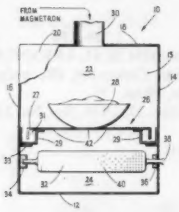

A switch actuating mechanism for an electrical limit switch. The actuating mechanism includes an actuating arm pivotally mounted at its upper end on the limit switch in interferring relation to the switch mechanism of the limit switch. When the actuating arm is contacted by a moving object, such as the carriage of a machine or the like, the actuating arm is pivoted into the switch mechanism operating the limit switch. As the object moves away from the actuating arm, the arm pivots downwardly, by the force of gravity, back to a neutral or centered position.

**3,789,178**

## MICROWAVE HEATING APPARATUS

**Paul F. Harhen, Westford, Mass., assignor to Sage Laboratories, Inc., Natick, Mass.**

**Filed Oct. 18, 1972, Ser. No. 298,535**
**Int. Cl. H05b** *9/06*
**U.S. Cl. 219—10.55** **20 Claims**



A combination microwave and gas oven having a divider shelf preferably horizontally disposed thereby dividing the oven cavity into a cooking section and a section containing the gas heating apparatus. The outer boundary of the shelf forms a low impedance choke with a perimetrical shelf holder thereby terminating microwave energy fed to the cooking section and preventing degradation of the gas heating apparatus disposed therebelow.

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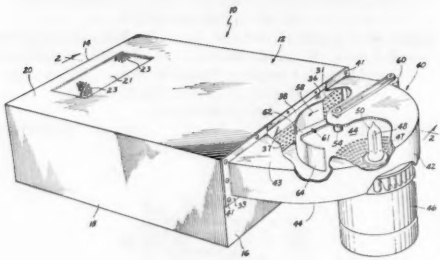
**3,789,179**

## MICROWAVE OVEN WITH PREMIXING OF WAVE ENERGY BEFORE DELIVERY TO ITS HEATING CAVITY

**Duane B. Haagensen, Edina, Minn., assignor to Matsuhita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed Apr. 3, 1972, Ser. No. 305,956**
**Int. Cl. H05b** *9/06*
**U.S. Cl. 219—10.55** **37 Claims**



An antenna protrudes into the interior of a semicyclindrical coupling and distribution structure extending from the rear of the heating cavity. Contained in the structure is a rotatable reflector unit composed of a horizontal flat arm and a curved vane depending downwardly therefrom. The end of the arm remote from the vane is mounted for rotation about a vertical axis at a location between the antenna and the heating cavity, the arm having a length such that the vane passes between the antenna and the semicircular rear wall of the structure during each revolution. The vane's radius of curvature is less than the radius of curvature of the wall so that the distance or spacing of the vane is continually varying with respect to the wall as well as continually varying with respect to the antenna, thereby causing considerable mode alterations or premixing of the microwave energy prior to its delivery into the heating cavity. Additional dispersion of the energy is effected as it enters the cavity by means of an inclined dispersive plate extending into the cavity from the opening or window through which the energy is introduced. In this way, the vertical dimension of the cavity is substantially reduced and at the same time the usable space therein is maximized by reason of the externally located coupling structure, which modulates the wave pattern of the energy entering the cavity.

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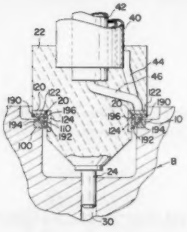
**3,789,180**

## MODIFIED INDUCTOR FOR INDUCTIVELY HEATING VALVE SEATS

**John F. Cachat, Cleveland, Ohio, assignor to Park-Ohio Industries, Inc., Cleveland, Ohio**

**Filed Dec. 26, 1972, Ser. No. 318,260**
**Int. Cl. H05b** *5/00*
**U.S. Cl. 219—10.57** **3 Claims**



An induction heating device of the type used for inductively heating a valve seat of an internal combustion engine and including a generally circular inductor, means for moving the inductor into coupling relationship with the valve seat and means for energizing the inductor with a high frequency alternating current. There is provided an improvement in this device including a positioning of a mechanically permeable element generally coextensive with the inductor and on the side of the inductor opposite to the valve seat. This improvement is beneficial when the valve seat is formed by a ferrous insert within a non-ferrous engine component.

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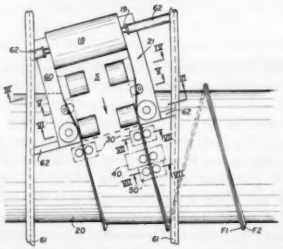
**3,789,181**

## METHOD OF SPIRALLY WINDING STRIP METAL ABOUT A PIPE, AND SECURING ADJACENT STRIPS BY WELDING

**Sture Netterstedt, and Bengt Lindstrand, both of Fagersta, Sweden, assignors to Rostfria Tak AB, Fagersta, Sweden**

**Division of Ser. No. 142,327, May 11, 1971, Pat. No. 3,715,557. This application Aug. 10, 1972, Ser. No. 279,315**
**Int. Cl. B23k** *1/18*
**U.S. Cl. 219—62** **5 Claims**



An annular carrier cage is placed around the pipe, which may be insulated. The carrier cage supports a holder for stain-

less steel strip, a flange forming apparatus, a flange extension apparatus, seam welding apparatus and a post-welding, flange stress relieving apparatus. To permit curling of the flanged strip about the circumference of the pipe, the flange extension apparatus reduces the diameter of the formed flange adjacent the edge thereof, for example by exerting pressure against the flange strip by a pair of conical rollers having their greater diameter adjacent the free edge of the flange. Adjacent flanges are welded together by roller electrodes, and a pair of conical rollers similar to the flange extension apparatus then bear against the welded joints to relieve stresses due to welding and provide for a tight wrap of the spiral, welded strip about the pipe.

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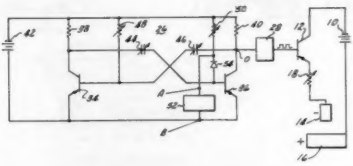
**3,789,182**

**APPARATUS FOR ELECTRICAL DISCHARGE MACHINING EMPLOYING PERIODIC EXTENDED PULSE OFF TIME**

**Dalton R. Verner, Orchard Lake, Mich., assignor to Colt Industries Operating Corp., Dividson, Mich.**

**Filed Feb. 23, 1972, Ser. No. 228,661**
**Int. Cl. B23p** *1/08*
**U.S. Cl. 219—69 C** **8 Claims**



Electrical discharge machining is provided by generating a series of rectangular machining power pulses at a controllable on-off time duration. Provision is made for introducing extended off time duration between groups of pulses to contribute to the improvement of cutting stability. In one alternate embodiment of the invention, a single on time pulse is provided intermediate a pair of spaced pulse groups.

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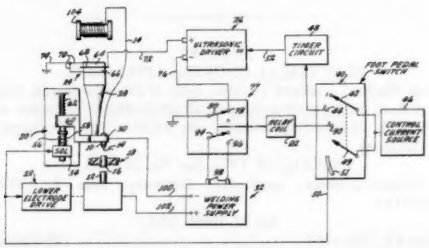
**3,789,183**

**THROUGH-INSULATION WELDING METHOD AND APPARATUS**

**Larry R. Conley, Fountain Valley, Calif., assignor to Accra-Point Arrays Corporation, Santa Ana, Calif.**

**Filed Feb. 28, 1973, Ser. No. 336,811**
**Int. Cl. B23k** *1/14*
**U.S. Cl. 219—92** **14 Claims**




A weld is made between an insulated wire and a terminal by pressing the wire against the terminal with an electrode, applying ultrasonic vibrations to the electrode to scrub away insulation so that electrical contact is made between the central conductor of the wire and both the terminal and electrode, and then applying a welding current through the electrode to flow through the wire and terminal to weld them together.

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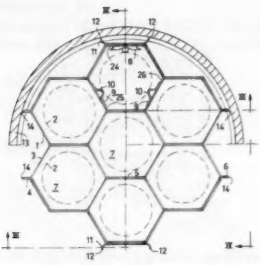
**3,789,184**

**AIR-EXCLUDING SPOT-WELDING METHOD FOR MAKING HEAT-EXCHANGE GRID**

**Gijsbrecht Gerhardus Piepers, Heiloo; Leonard Hendrik Vons; Aart van der Linde, both of Alkmaar, and Edward Ljbrink, Bergen, all of Netherlands, assignors to Reactor Centrum Nederland, The Hague, Netherlands**

**Division of Ser. No. 887,801, Dec. 23, 1969, Pat. No. 3,646,994. This application Apr. 16, 1971, Ser. No. 134,684**
**Int. Cl. B23k** *11/10, 11/16;* **F28f** *9/00*
**U.S. Cl. 219—117 R** **1 Claim**



A method for spot welding Zircalloy straps in open air to form a heat-exchange grid for holding a plurality of rod-like elements against lateral displacement. Contiguous areas of the straps are clamped between spot-welding electrodes and immediately thereafter the clamped areas are sprayed with a non-viscous volatile liquid, preferably a pure organic compound free of sulfur, fluorine, chlorine and iodine, such as acetone or ethanol. Heated by the welding current, the liquid volatilizes to expell air, thus preventing weakening of the weld by absorbed nitrogen or oxygen.

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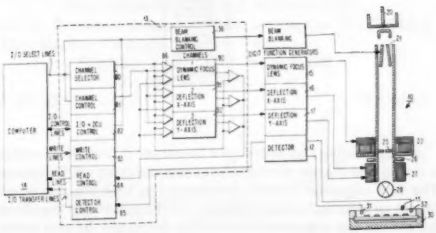
**3,789,185**

**ELECTRON BEAM DEFLECTION CONTROL APPARATUS**

**Edwin C. Baldwin, and Warren R. Wrenner, both of Endicott, N.Y., assignors to International Business Macnines Corporation, Armonk, N.Y.**

**Division of Ser. No. 884,889, Dec. 15, 1969, Pat. No. 3,699,304. This application June 1, 1971, Ser. No. 148,918**
**Int. Cl. B23k** *15/00*
**U.S. Cl. 219—121 EB** **6 Claims**



Apparatus for controlling the deflection of an energy beam to impinge a workpiece with improved accuracy. A computer

and interface unit direct the movement of the beam over a master target to learn and record addresses of impingement areas corresponding to those on a workpiece. Differential current flow in two conductive elements is used to determine accurate location of the address. Upon the substitution of a workpiece for the master target, impingement addresses can be selected without additional corrective deflection circuits.

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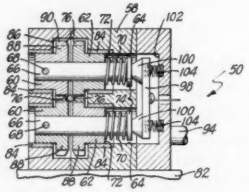
**3,789,186**
**CURRENT TRANSFER IN CONNECTION WITH ELECTRIC WELDING**
**Henry V. Rygiol, 16437 E. Janine, Whittier, Calif.**
**Filed Mar. 13, 1972, Ser. No. 233,961**
**Int. Cl. B23k** *9/00*
**U.S. Cl. 219—130** **5 Claims**



In electric welding utilizing a wire to supply metal to a weld area a current is supplied to the wire as the wire is continuously advanced to the weld area. In accordance with the invention the current can be effectively supplied to the wire utilizing a plurality of electrically conductive rollers having surfaces which engage the wire. These rollers roll in synchronism with the wire and transfer current supplied to them to the wire.

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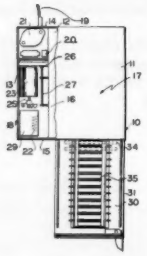
**3,789,187**
**AUTOMATIC CIGARETTE LIGHTER**
**Jan Brezina, Ste. 401, 2221-14th St., S.W., Calgary, Alberta, Canada**
**Filed June 19, 1973, Ser. No. 371,375**
**Int. Cl. F23q** *7/00*
**U.S. Cl. 219—261** **4 Claims**



A tray holding cigarettes on a conveyor is contained within a casing and a lever is movable across the front of the casing. The first cigarette is moved sideways so that the top is adjacent an electric heating element. At the same time the elevator moves the cigarettes in the tray forwardly by one increment so that the next cigarette is in position. As the lever is moved, the element is connected to a source of electrical energy and a small fan blows air passed the tip so that the cigarette lights. The cigarette is being grasped frictionally spaced from the end for pivotal movement and the motor driving the fan also rotates a worm which causes a small jaw or prong to engage the cigarette spaced from the tip and beyond the point of pivotal attachment so that the cigarette is gradually moved through approximately 90° while at the same time the tip remains adjacent the heating element. The speed of the worm is such that the cigarette is fully lighted as the pivotal action of the cigarette is completed so that the user can then grasp the cigarette and pull it from between the jaws at which time the cigarette, of course, is ready for use.

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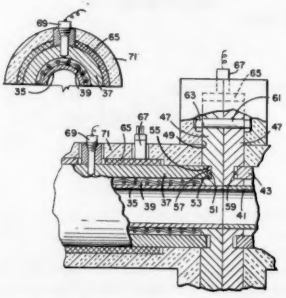
**3,789,188**
**INSULATED PIPE LINE FOR HEATED MATERIALS**
**Frank Rudbarg, Bala-Cynwyd, Pa., assignor to FMC Corporation, Philadelphia, Pa.**
**Filed Feb. 14, 1972, Ser. No. 226,119**
**Int. Cl. H05b** *3/00;* **F16l** *53/00*
**U.S. Cl. 219—301** **7 Claims**



Apparatus for transporting a heated flowable material which includes at least one pair of telescoped conduits which are spaced from each other throughout the lengths thereof and which are formed of heat conductive material. The outermost of such telescoped conduits is electrically heated and is slidably supported within grooves formed in opposing surfaces of flanges fixed to the ends of the innermost of such telescoped conduits so that such outermost conduit may move freely in a longitudinal direction under varying thermal conditions. A spacer is disposed between the telescoped conduits only at spaced intervals thereof and and engages with the outermost of such conduits only when at least one of such telescoped conduits is subjected to deflections which would otherwise urge such telescoped conduits into direct contact with each other.

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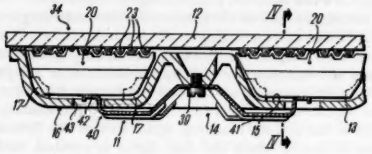
**3,789,189**
**ELECTRICAL COOKING APPLIANCE**
**Karl Fischer; Gerhard Gossler, both of Oberderdingen, and Robert Kicherer, Knittlingen, all of Germany, assignors to E.G.D. Elektro-Gerate Blanc und Fischer, Oberderdingen, Germany**
**Filed Aug. 22, 1972, Ser. No. 282,701**
**Claims priority, application Germany, Feb. 3, 1972, 2205132**
**Int. Cl. H05b** *3/68*
**U.S. Cl. 219—464** **25 Claims**

An electrical cooking appliance has an upper glass-ceramic plate for supporting the cooking vessels to be heated. A heating unit is disposed below the or each heating zone of the plate and comprises a spiral heating element disposed in a supporting bowl. Leak springs outside the bowl act on the heating element by way of cross pieces inside the bowl and press the heat-

ing element by a flat surface thereof into good heat-conductive relationship with the underside of the glass-ceramic plate.



The heating element is in two parts with a temperature sensing element disposed therebetween, the latter also being pressed against the underside of the plate.

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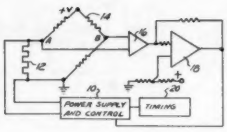
**3,789,190**
**TEMPERATURE REGULATION FOR ELECTRICAL HEATER**

**David J. Orosy, and Abraham J. Matlen, both of Detroit, Mich., assignors to Abraham J. Matlen, Detroit, Mich.**

**Filed Oct. 17, 1972, Ser. No. 298,294**
**Int. Cl. H05b** *1/02*
**U.S. Cl. 219—497** **5 Claims**




A temperature control system for use in an electrical heating device wherein the heating element also functions as the temperature sensing element. The resistance of the heating element varies linearly with temperature and the changes in resistance, detected as voltage variations across a wheatstone bridge, regulate the heating. The system is operable in either the A.C. or D.C. mode and includes a temperature measuring circuit, a timing circuit and a control circuit.

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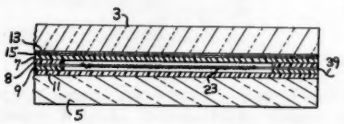
**3,789,191**
**TEMPERATURE SENSOR**

**Robert G. Spindler, Allison Park, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.**

**Continuation-in-part of Ser. No. 199,221, Nov. 16, 1971, abandoned. This application Sept. 1, 1972, Ser. No. 285,779**
**Int. Cl. H01c** *7/10*
**U.S. Cl. 338—24** **12 Claims**



A temperature sensor suitable for use in an electrically heated, laminated window is disclosed. The laminated window includes a plastic interlayer material sandwiched between two rigid, transparent sheets, one of which sheets has an electrically conductive coating in contact with the interlayer. Embedded within the plastic interlayer is the temperature sensor which is comprised of a resistance filament encapsulated within a substantially material which has a heat deflection temperature greater than the plastic interlayer. Because the temperature sensor has a casing with a higher heat deflection temperature than the plastic interlayer into which it is embedded, fracture and shorting of the resistance filament against the electrically conductive coating, during the high temperature and high pressure conditions of laminating, are avoided. In a particular embodiment of the invention where the interlayer material is plasticized, a protective layer disposed between the interlayer and casing material to prevent hazing is disclosed.

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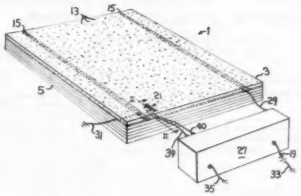
**3,789,192**
**ELECTRICALLY HEATED WINDOW WITH A TEMPERATURE SENSOR**

**Robert G. Spindler, Allison Park, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.**

**Continuation-in-part of Ser. No. 199,221, Nov. 16, 1971, abandoned. This application Sept. 1, 1972, Ser. No. 285,780**
**Int. Cl. H05b** *3/06*
**U.S. Cl. 219—522** **27 Claims**



An electrically heated transparent window and a constant temperature control system for such transparency is disclosed. In the preferred embodiment the transparency includes a plastic interlayer material sandwiched between two rigid, transparent sheets, one of which sheets has an electrical heating means adjacent to it and in contact with the interlayer. Embedded within the plastic interlayer is a temperature sensor which is comprised of a resistance filament encapsulated within a casing material which has a heat deflection temperature greater than the plastic interlayer. Because the temperature sensor has a casing with a higher heat deflection temperature than the plastic interlayer into which it is embedded, fracture and shorting of the resistance filament against the electrical heating means, during the high temperature and high pressure conditions of laminating, are avoided. In a particular embodiment of the invention where the interlayer material is plasticized, a protective layer disposed between the interlayer and casing material to prevent hazing is disclosed.

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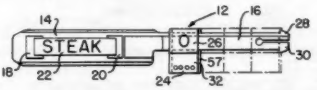
**3,789,193**
**PRICE SETTING KEYS AND METHOD OF TRANSFERRING PRICE TO PRINTER**

**David F. Bremner, Bellbrook, Ohio, assignor to The National Cash Register Company, Dayton, Ohio**

**Filed Jan. 7, 1972, Ser. No. 216,108**
**Int. Cl. G06k** *7/00, 19/00*
**U.S. Cl. 235—61.11 R** **24 Claims**




A programmable automatic price setting key for use with a reader to transfer the price to a computer controlled printer

for printing the proper base multiple of a commodity. A plurality of price setting tabs have slots therein for insertion on the key, the tabs including two rows of holes, one for clock-pulse generation and the other for supplying coded data. The reader unit incorporates a slot for the key and includes a light source and diffusing lens system along with a slide head with photodiodes positioned to pass over the rows of holes and thereby generate a series of pulses in binary code, corresponding to human readable characters on the key tabs, for transfer of the code to the computer.

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**3,789,194**

**RELATING TO COUNTING MACHINES**

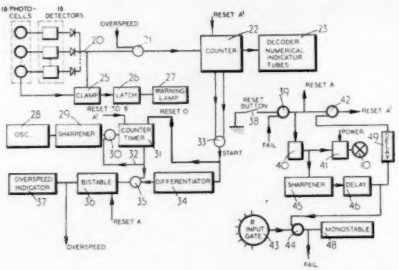
**John Kirby, Manchester, England, assignor to Kirby Lester Electronics Limited, Oldham, Lancashire, England**

**Filed Sept. 8, 1971, Ser. No. 178,571**

**Claims priority, application Great Britain, Sept. 8, 1970, 42867/70**

**Int. Cl. G06m** *1/272*

**U.S. Cl. 235—92 PK** **9 Claims**




A machine for counting articles, comprising means for dispersing a flow of articles to be counted into separate streams, means for providing a substantially even flow of articles to the dispersing means, a detector associated with each stream for detecting each article in that stream and counting means fed by the outputs from all detectors for counting the total number of articles in all the stream.

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**3,789,195**

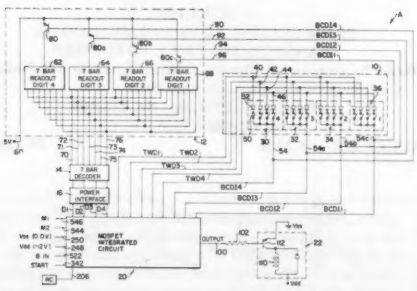
**DIGITAL COUNTER AND TIMER WITH MULTIPLEX SETTING AND READOUT**

**Carl H. Meier, and Robert R. White, both of Scott, Iowa, assignors to Gulf Western Industries, Inc., New York, N.Y.**

**Filed May 9, 1972, Ser. No. 251,774**

**Int. Cl. H03k** *21/18*

**U.S. Cl. 235—92 T** **34 Claims**




A digital counter used as a counter or timer and including at least first and second down counters and a network for loading a selected digit into each of the counters. A readout device is provided for each of the counters. A first signal connects the first down counters onto both of the readout devices and also energizes the readout device corresponding to the first counter. In a like manner, a second signal connects the second down counter to both of the readout devices and energizes the readout device corresponding to the second counter. There is also provided a signal for blocking the loading feature of the counters and enabling the counting function after a digit has been loaded into each of the down counters. The first and second signals also control the operation of the loading feature when there is no blocking signal so that the first down counter is loaded when the first signal is created, and the second down counter is loaded when the second signal is created.

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**3,789,196**

**NUMBER OF DAYS INTEGRATING TYPE TIME SWITCH**

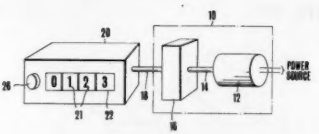
**Masao Kinemura, Matsue, and Koshei Arita, Tokyo, both of Japan, assignors to Koshei Arita, Tokyo, Japan**

**Filed June 20, 1972, Ser. No. 264,490**

**Claims priority, application Japan, July 3, 1971, 46/49123**

**Int. Cl. G06m** *3/02*

**U.S. Cl. 235—132 A** **3 Claims**




The time switch comprises a clock mechanism operating at a constant speed and a mechanical counter driven by the clock mechanism. The counter comprises a plurality of digit wheels for counting the number of days and a signal generator which is operated by the counter when it has counted a predetermined number of days.

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**3,789,197**

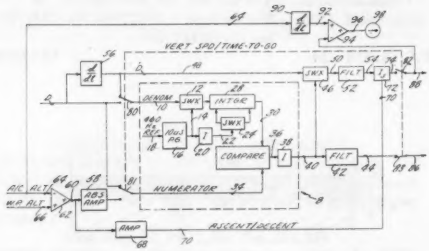
**ANALOG DIVIDER AND NAVIGATION COMPUTER**

**John E. Games, Granby, Conn., assignor to United Aircraft Corporation, East Hartford, Conn.**

**Filed July 3, 1972, Ser. No. 268,256**

**Int. Cl. G06g** *7/78, 7/16, 7/18*

**U.S. Cl. 235—150.27** **4 Claims**




A voltage analog of a denominator is integrated for a period of time, and then the integrator is reset to zero, cyclically; the output of the integrator is compared with a voltage analog of a numerator, the output of the comparison comprising a pulsewidth modulated analog of the quotient; a DC analog of the quotient may be provided by filtering. In one specific embodiment, the numerator analog is proportional to the distance of

an aircraft to a way point and the denominator analog is proportional to the ground speed of the aircraft toward the way point, the quotient being proportional to time-to-go to the way point. In another embodiment, the pulsewidth modulated quotient is used as a multiplier, to switch, and thereby provide pulsewidth modulation to, a DC voltage analog of a multiplicand. In another specific embodiment of a navigation computer, a command vertical speed signal is derived as the product of ground speed toward the way point and a quotient, the quotient being the difference between aircraft altitude and desired altitude at the selected way point divided by the horizontal distance to the way point. In a further specific embodiment, the difference between the rate of change of altitude and the command vertical speed is used as a vertical navigation indication.

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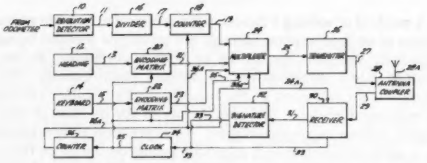
**3,789,198**

## VEHICLE LOCATION MONITORING SYSTEM

**Alfred J. Henson, and Richard W. Lewis, both of Derby, Kans., assignors to The Boeing Company, Seattle, Wash.**

**Filed Apr. 10, 1972, Ser. No. 242,349**
**Int. Cl. G06f** *15/48;* **G01c** *7/04, 21/10*
**U.S. Cl. 235—150.27** **18 Claims**



After a discussion of prior systems for indicating at a central location the instantaneous location of one or more vehicles, such as police cars or taxi cabs, an improved system of this type is described which uses the principles of dead reckoning. The improved system includes a distance sensor, such as a counter storing revolutions of the vehicle's odometer, and a heading sensor, such as a magnetic compass, which are located in a vehicle. A time-multiplex communications system provides for transmission of changes in distance and heading to a central location at periodic intervals. The location of each vehicle is stored in a computer, starting with an initial known position, and periodically updated thereby using the transmitted distance change and heading change information. If desired, the stored vehicle locations may be transmitted to a display unit. To compensate for accumulated errors customary in dead reckoning systems, the computer also periodically compares the stored location of each vehicle against an internally stored matrix corresponding to the known streets, roadways and alleyway of the area. If the vehicle location and road location do not match, the vehicle location is updated to correspond to the nearest street.

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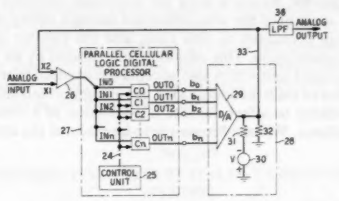
**3,789,199**

## SIGNAL MODE CONVERTER AND PROCESSOR

**Allan Joseph Kotwicki, Detroit, Mich., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed May 1, 1972, Ser. No. 249,383**
**Int. Cl. G06j** *1/00*
**U.S. Cl. 235—150.5** **8 Claims**

An analog signal comparator is coupled to provide its output to a data processor which has digital outputs coupled through a digital-to-analog converter to an input of the comparator, for periodically producing in the processor digital representations of samples of another analog signal that is also applied to the comparator. In each sampling period, additional data processing is carried out with respect to the digital representations; and an output circuit coupled to the con-



verter output employs a filter circuit to select only the results of the last-mentioned processing. The additional processing is shown for digital filters featuring single and tandem sections.

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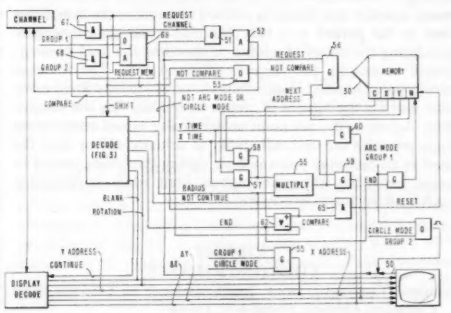
**3,789,200**

## CIRCLE OR ARC GENERATOR FOR GRAPHIC DISPLAY

**Lorenza S. Childress, Salisbury Mills, and Ralph J. Gundrum, Rhineback, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed June 30, 1972, Ser. No. 267,800**
**Int. Cl. G06f** *3/14*
**U.S. Cl. 235—151** **8 Claims**



The operations in a data processing system for drawing circles or other geometric figures on a display which are conventionally defined by a series of instructions prepared by a problem programmer are included in a standardized form in a small memory that is made part of the display unit. The problem programmer has only to specify either the starting point of an arc of the center point of a circle, the radius of the arc or circle, and other optional characteristics such as whether the circle or arc is to be drawn clockwise or counter clockwise, whether the beam of the display is blanked or unblanked, and whether additional instructions for drawing additional arc segments are to be expected or requested by the display. Logic and timing means are provided for accessing the memory in response to these values specified by the problem programmer and for generating a desired sequence of X and Y incremental signals for operating the display.

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**3,789,201**

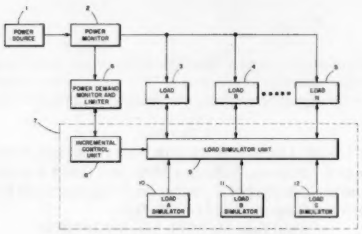
## SIMULATED LOAD FORECAST AND CONTROL APPARATUS

**Edward J. Carpenter, Lynnwood, and Warren L. Leyde, Seattle, both of Wash., assignors to Pacific Technology, Inc., Renton, Wash.**

**Filed May 18, 1972, Ser. No. 254,388**
**Int. Cl. G06f** *15/56;* **G05b** *15/02*
**U.S. Cl. 235—151.21** **11 Claims**

In order to observe the effect of adding or shedding a load upon the total energy consumed during a billing period and, if

desired, to effect such an add or shed operation, simulation and control apparatus is provided for use in conjunction with a power demand monitor and limiter. The power demand monitor and limiter, which is prior art apparatus, contains at all times an account of the time consumed during a billing period, the energy consumed to that time, and the current rate of energy consumption. This information is utilized by an incremental control unit which also accepts information representing the size of each individual load in a system, which information is utilized to affect the rate of oscillation of a simulated load oscillator. When a forecast is to be made of the effect of




adding or shedding a load, the information from the power demand monitor and limiter is utilized to simulate the remaining time in the period at a very fast rate while simultaneously simulating the effect of adding or shedding the load contemplated in exactly the same accelerated rate. The forecast results are contained in an accumulator which may drive a display unit for the benefit of an operator observing the simulation. Additionally, set point switches and count comparison logic provides the optional ability to actually add or shed the load at an optimum point in time during the billing period to avoid exceeding the consumption limit while approaching such limit as closely as possible.

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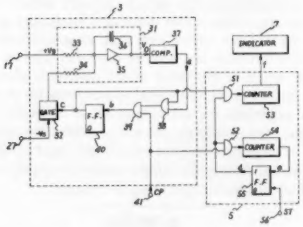
**3,789,202**

## COUNTING BALANCE

**Masami Yamanaka, Miki, Japan, assignor to Yamatos Scale Company, Limited, Hyogo-ken, Japan**

**Filed Aug. 23, 1972, Ser. No. 283,096**
**Claims priority, application Japan, Dec. 28, 1971, 47/3275**
**Int. Cl. G01g** *19/413*
**U.S. Cl. 235—151.33** **1 Claim**



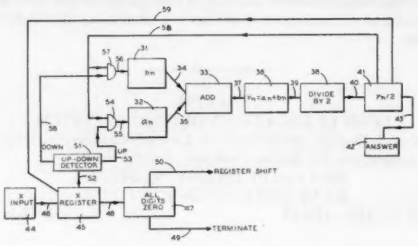

A counting balance having means for producing a first voltage proportional to the weight of an unknown number of articles, means for producing a voltage proportional to the weight of a known number of articles, comparing said voltages and producing a train of pulses having a frequency proportional to the ratio of said voltages and then counting the number of pulses during a predetermined interval to determine the number of said unknown articles.

**3,789,203**

## FUNCTION GENERATION BY APPROXIMATION EMPLOYING INTERATIVE INTERPOLATION

**Reginald Catherall, Woking, and Susan Knowles, Reading, both of England, assignors to The Solartron Electronic Group Ltd., Farnborough, Hampshire, England**

**Filed July 16, 1971, Ser. No. 163,360**
**Claims priority, application Great Britain, July 17, 1970, 34,900/70**
**Int. Cl. G06f** *7/38*
**U.S. Cl. 235—152** **22 Claims**




A method of solving a function for values of a variable when values of an independent variable are given, the method being especially valuable for use in or with a computer, an advantage being minimization of storage requirements. The method is an extension of the branch of mathematics known as numerical analysis, and specifically of the division of that branch known as approximation. An expression is developed for a locus of points which approach points on the given function, i.e., a polynomial expression having a high degree of convergence. The method includes finding solutions to the terms of the polynomial expression by reiterated interpolation. Only a relatively small number of factors need be stored. The method can be employed to calculate values to predetermined accuracy, and is suitable for many functions although it is especially well suited for many transcendental functions. Embodiments of apparatus suitable for performing the method are also disclosed. The apparatus includes elements of electronic data processing such as shift registers, adders, and the like to perform the interpolation involving addition, subtraction and division by 2. The algorithm developed as a manifestation of this method is describable as an add-shift algorithm.

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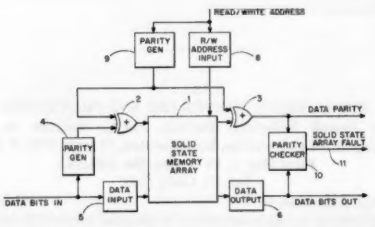
**3,789,204**

## SELF-CHECKING DIGITAL STORAGE SYSTEM

**George Joseph Barlow, Tewksbury, Mass., assignor to Honeywell Information Systems Inc., Waltham, Mass.**

**Filed June 6, 1972, Ser. No. 260,154**
**Int. Cl. G06f** *11/10;* **G11c** *29/00*
**U.S. Cl. 235—153 AM** **16 Claims**



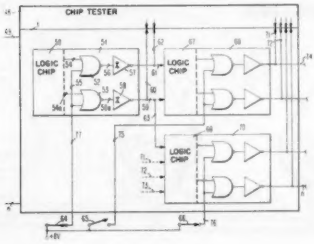

A self-checking digital storage system and method for detecting faults within the storage system. An address word for a memory location into which information is to be written is combined with a data word that is contained in that address lo-

cation and one combined parity bit is generated for the combined words and placed into memory. When the information is accessed, the address information is subtracted from the data information to indicate correct data information if the data parity corresponds to the original data parity.

### 3,789,205
### METHOD OF TESTING MOSFET PLANAR BOARDS

**Randell Leland James, Austin, Tex., assignor to International Business Machines Corporation, Armonk, N.Y.**

**Filed Sept. 28, 1972, Ser. No. 293,270**
**Int. Cl. G06f** *11/04*
**U.S. Cl. 235—153 AC** **11 Claims**

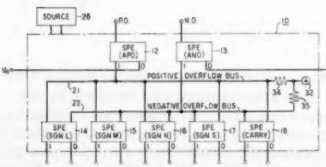



A technique of testing a MOSFET planar board in which each of the chips on the planar board can be electronically isolated for individual testing. In MOSFET technology there are two off chip inverters between the output logic blocks and the pins. These are the preoff chip inverter and the off chip inverter. A NOR gate is formed by adding an additional input line to each of the preoff chip inverters of each of the chips on the board, and the output of each of the chips which are not to be tested are driven to logical ones by application of a positive logical level to this input line while no input is applied to the NOR gates on the outputs of the chip which is to be tested. In this manner, all inputs to the chip to be tested are at a one or high logical level, and for test purposes each input to the chip can be brought to a low logical level or left at a high logical level in accordance with the test pattern to be applied. Its output or reaction to the input test patterns is monitored in the normal manner by the chip tester. Through utilization of this technique, the same test patterns which might number three thousand can be applied to the chip such that even though it remains on the planar board it can be tested equivalent to new. In this manner, each chip can be tested and a defective chip on a planar board isolated without mechanically isolating the chips by breaking chip interconnections.

### 3,789,206
### THRESHOLD LOGIC OVERFLOW DETECTOR FOR A THREE-INPUT ADDER

**John Donnell Heightley, Basking Ridge, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Apr. 4, 1972, Ser. No. 240,955**
**Int. Cl. G06f** *7/50*
**U.S. Cl. 235—172** **17 Claims**

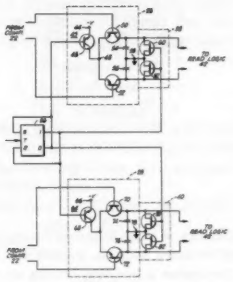



A threshold logic overflow detector for a three-input adder is a combination of storage-processor elements and a pair of busses arranged so that three input-word sign-bits, a sum-word sign-bit, and at least one carry-bit from the adder are stored in separate storage-processor elements for controlling units of current conducted through the busses. Predetermined potentials are established on the busses in response to the units of current conducted therethrough. Two additional storage-processor elements respectively compare the potentials on the busses with a predetermined reference potential and thereby determine the occurrence and polarity of any net overflows that occur in the three-input adder.

### 3,789,207
### INTEGRATING CIRCUIT FOR DATA RECOVERY SYSTEM

**William H. Jones, Oklahoma City, Okla., assignor to Honeywell Information Systems Inc., Waltham, Mass.**

**Filed Sept. 22, 1972, Ser. No. 291,444**
**Int. Cl. G06g** *7/18*; **G11b** *5/02*
**U.S. Cl. 235—183** **8 Claims**

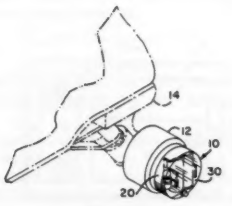


For use in a system which recovers data stored in a disk memory unit by (1) integrating signals over successive halves of data cells and (2) comparing the results of the integrations, an improved integrating circuit having a differential transistor amplifier driven by a single current source. Where NPN transistors are used, the collector terminals of the transistors are connected to charging capacitors and field effect transistors in parallel between the transistors and ground. To start integration, the current source is biased on and the field effect transistors are biased off. To stop integration, the current source is biased off and the field effect transistors are triggered into conduction.

### 3,789,208
### SKATE WHEEL ATTACHMENT

**Elwood C. Lewis, Valley View Apartments, Allentown, Pa.**

**Filed Sept. 18, 1972, Ser. No. 290,062**
**Int. Cl. F21v** *33/00*
**U.S. Cl. 240—6.4 R** **7 Claims**




A roller skate wheel attachment which is removably attachable to a wheel at the axle thereof. The device includes a

connector which removably affixes to the wheel axle and a rotary member which is rotable about the connector and which rotates when the wheel rotates. In one embodiment of the invention, the rotary member incorporates a switch which serves to alternately energize and de-energize lamps as the wheel rotates. In a second embodiment, the rotary member includes a reflecting surface to rotatively reflect light from exterior lighting sources when the skate wheel rotates.

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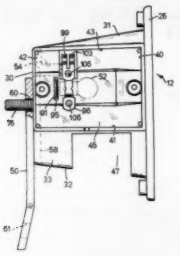
**3,789,209**
**VEHICLE LAMP**
**Bernard R. Weber, and David W. Wendt, both of Janesville, Wis., assignors to Wesbar Corporation, West Bend, Wis.**
**Filed Oct. 25, 1972, Ser. No. 300,502**
**Int. Cl. B60q** *1/00, 3/00*
**U.S. Cl. 240—7.1 R** **17 Claims**



Two embodiments of vehicle lamps for mounting near the rear corners of vehicles such as trailers are disclosed. Both embodiments comprise a housing having an end wall and a side wall, a double filament bulb mounted inside the housing serving as tail light, stop light and turn signal, a single filament bulb mounted outside the side wall of the housing serving as a side marker light, suitable lenses for each bulb, mounting bolts projecting from the end wall, external connecting means enabling external electrical connections to the unit, an internal connecting means between the two bulbs. The internal connecting means comprise a flexible jumper wire and improved means for securing each end thereof. The external electrical connecting means comprise releasable push-in terminals. Wire harness grooves are provided on the exterior of the end wall. The embodiment for use on the left rear corner of the vehicle includes a license plate bracket and a lens in a hole in the side wall for license plate illumination.

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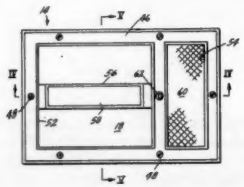
**3,789,210**
**RECESSED LIGHTED ASSIST BAR**
**Carl Weber, Battle Creek; Larry L. Shroyer, Union City, and James T. Baker, Marshall, all of Mich., assignors to Progressive Dynamics, Inc., Marshall, Mich.**
**Filed Mar. 16, 1973, Ser. No. 342,268**
**Int. Cl. B60g** *1/24*
**U.S. Cl. 240—7.3** **7 Claims**



A hand hold assist bar unit for mounting in vertical panels, particularly suitable for mounting in the exterior wall or panel of recreational vehicles adjacent an access door, the unit being of a recessed configuration having peripherally disposed mounting flanges. An electric lamp within the recess illuminates the same, and a hand hold bar extending across the recess may be readily grasped. A lens mounted on the unit body diffuses the light, and the unit also functions as a porch light.

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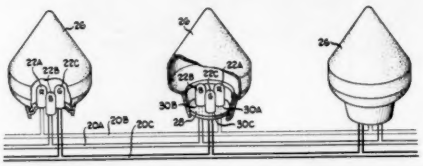
**3,789,211**
**DECORATIVE LIGHTING SYSTEM**
**Norman Kramer, Skokie, Ill., assignor to Marvin Glass & Associates, Chicago, Ill.**
**Filed July 14, 1972, Ser. No. 271,808**
**Int. Cl. H05b** *37/02*
**U.S. Cl. 240—10 R** **13 Claims**



A multi-channel lighting system which includes a lamp load for each channel. Each channel is a nominally identical self-modulating half-wave phase control circuit employing DC feedback to modify both reference and pedestal levels in a dual frequency oscillator. The result is a random off and on pattern for each channel. Each lamp load is a different color which produces a random and dynamic color light display in response to each channel for decorating Christmas trees or the like.

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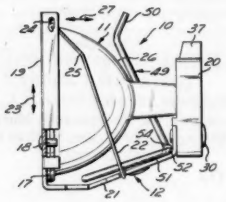
**3,789,212**
**PHOTOGRAPHIC LIGHTING UNIT**
**Donald M. Wagner, Pepper Pike, Ohio, assignor to General Electric Company, Schenectady, N.Y.**
**Filed Jan. 26, 1973, Ser. No. 326,585**
**Int. Cl. F21v** *21/00*
**U.S. Cl. 240—52 R** **10 Claims**

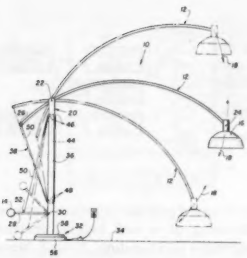


A lighting unit comprising a reflector lamp, a holder having a socket and faceplate connected by a base member and having a means for accurately aligning and firmly holding the reflector lamp. The means for aligning and holding is a set of aligning stops at the bottom inner side of the faceplate and a spring wire positioned so that the wire exerts a downward and forward force on the reflector to hold it in place against the faceplate and alignment stops. In one variation of the lighting assembly, a lever-type ejector is attached to the holder for easy removal of the reflector lamp.

## 3,789,213
## COUNTERBALANCED LAMP

Robert Sonneman, New Rochelle, N.Y., assignor to Robert Sonneman Associates, Inc., Woodside, N.Y.

Filed Apr. 24, 1973, Ser. No. 354,105
Int. Cl. F21v 21/20
U.S. Cl. 240—69 4 Claims

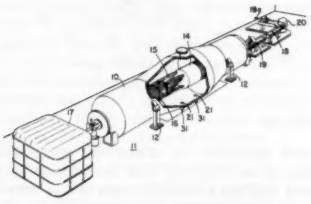


A lamp having an elevated, freely movable light boom counterbalanced, by a weight located adjacent the lamp base. The weight is attached to a lever pivotally mounted on the lamp base. The lever is connected to an end of the light boom by means of a cable and pulley arrangement. Thus, inadvertent disengagement of the weight or its movement presents an optimum, minimum safety hazard.

## 3,789,214
## IRRADIATION APPARATUS

Charles H. Goldie, Bedford, and Robert A. Fernald, Carlisle, both of Mass., assignors to The United States of America as represented by the United States Atomic Energy Commission, Washington, D.C.

Filed July 21, 1967, Ser. No. 655,231
Int. Cl. H01j 37/00
U.S. Cl. 250—354 11 Claims

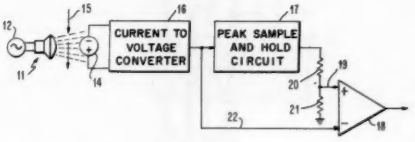


An apparatus for introducing ionizing radiation into compressed gas insulation systems, such as high voltage generators or transmission lines to smooth out electrical discontinuities, particularly those caused by foreign particulates, that produce high gradients and to increase the voltage holding capability of the system. The apparatus of the invention may also be used to regulate and stabilize the voltage of the system by varying the amount of applied load. A corona discharge device may also be used in conjunction with the invention.

## 3,789,215
## PHOTOSENSITIVE DOCUMENT DETECTOR WITH AUTOMATIC COMPENSATION

Robert Elton Penny, Raleigh, N.C., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Sept. 8, 1972, Ser. No. 287,301
Int. Cl. G01n 21/30
U.S. Cl. 250—206 2 Claims

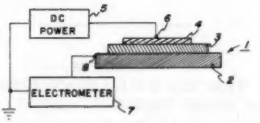



A photosensitive circuit for use in document handling equipment which detects the passage of single and multiple documents past a counting station or the like and in which component aging or other variation is automatically compensated.

## 3,789,216
## PHOTODETECTION DEVICE AND METHOD COMPRISING PHTHALOCYANINE

Richard J. Komp, Bowling Green, Ky., assignor to Xerox Corporation, Stamford, Conn.

Filed Jan. 2, 1973, Ser. No. 320,421
Int. Cl. G01j 1/42
U.S. Cl. 250—211 R 13 Claims




Photoelectric device comprising a pair of electrodes, at least one of which is transparent, and sandwiched therebetween an interlayer containing a phthalocyanine pigment dispersed in an organic film forming polymeric binder. During operation of this device a biasing potential is applied across these electrodes and the interlayer irradiated through the transparent electrode which serves as a window for this photoelectric device. Because of the very high photosensitivity and rapid response times of this inter-layer, this device is suitable for use in detection of relatively low intensity incident or reflected light of short impulse duration. This sensitivity and spectral response to light in the red band of the visible spectrum makes such a device ideally suited for use in conjunction with red laser scanners.

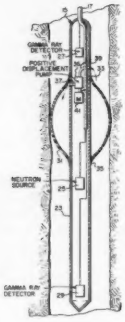
## 3,789,217
## WATER PRODUCTION SYSTEM HAVING MEANS TO SELECTIVELY PROFILE VARY BOREHOLE FLUID FLOW

Arthur H. Youmans, Houston, Tex., assignor to Dresser Industries, Inc., Dallas, Tex.

Continuation of Ser. No. 715,338, March 22, 1968, abandoned. This application Feb. 10, 1970, Ser. No. 9,116
Int. Cl. G01t 1/16
U.S. Cl. 250—265 10 Claims

This specification discloses a system for obtaining a water production profile of a producing oil well. A logging instrument is used having a deuterium tritium neutron source. A de-

tector is mounted in the tool above the neutron source and an inflatable bag is positioned between the source and this detector. A positive displacement pump, servo-controlled from the surface, is provided to permit precisely determined amounts of liquid to be pumped into the bag from the borehole to thus vary the transit time of the borehole fluid from the source to




the detector by a known amount. A second detector is positioned below the neutron source to detect whether any downward circulation in the borehole takes place.

In an alternative embodiment, a pair of detectors are positioned on the same side of the source within the borehole instrument.

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**3,789,218**

**TRACKER BALL ARRANGEMENTS**

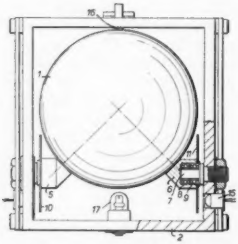
**Eric Albert Blount, Chelmsford, England, assignor to The Marconi Company Limited, Essex, England**

**Filed Apr. 3, 1972, Ser. No. 240,615**

**Claims priority, application Great Britain, June 12, 1971, 27,651/71**

**Int. Cl. G01d** *5/34*

**U.S. Cl. 250—231 SE** **5 Claims**



A tracker ball, supported by a caster, drives two mutually perpendicular conical members, each mounted on a stub axle carrying an apertured disc. Light shone through each disc is detected by two photodetectors, the frequency and order of the detected light representing the ball movement. The conical members may be formed on the axles themselves, which may be mounted in opposite walls or both in the same wall of the ball housing.

**3,789,219**

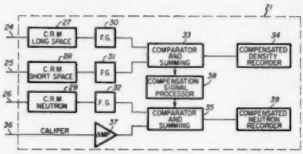
**MUD CAKE COMPENSATED NEUTRON LOGGING SYSTEM**

**Billy Fred Wilson, Houston, Tex., assignor to Dresser Industries, Inc., Dallas, Tex.**

**Filed Apr. 24, 1972, Ser. No. 247,128**

**Int. Cl. G01v** *5/00*

**U.S. Cl. 250—264** **9 Claims**




A neutron source and a gamma ray source are positioned in the instrument housing of a well logging instrument to irradiate the formations surrounding a well bore. A short-spaced gamma ray detector and a long-spaced gamma ray detector positioned in the instrument housing detect radiation from the formations and transmit electrical signals representing the radiation to the surface. The electrical signals are compared to provide a signal representing mud cake in the well bore. A third detector positioned in the instrument housing detects radiation from the formations surrounding the well bore and transmits a neutron logging signal to the surface. The signal representing mud cake in the well bore is applied to the neutron logging signal to provide a mud cake compensated neutron log.

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**3,789,220**

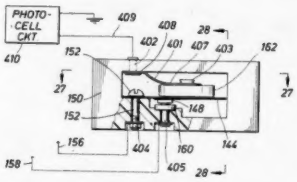
**LIGHT SENSITIVE ELECTRICAL TIMING CIRCUIT**

**Ezra L. Schacht, 1620 W. Main St., Houston, Tex.**

**Continuation-in-part of Ser. No. 238,088, March 27, 1972. This application Sept. 8, 1972, Ser. No. 287,369**

**Int. Cl. H01j** *39/12*

**U.S. Cl. 250—206** **3 Claims**

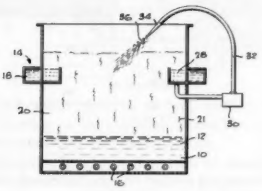



Method and apparatus for controlling energization and deenergization of an electrical load circuit such as a floodlighting circuit utilizing a control system that is responsive to predetermined conditions of atmospheric light. A timing sequence may be initiated upon the occurrence of a predetermined degree of morning atmospheric light which timing sequence functions to deenergize the load circuit at the end of a predetermined period of time measured from dawn, the load circuit being previously energized responsive to predetermined decrease in the amount of evening atmospheric light. The timing sequence may be variable, responsive to variations in the length of daylight hours, and may function to achieve deenergization of the load circuit at approximately the same time each night, thereby precluding unnecessary operation of the load circuit during certain periods during the year.

## 3,789,221
## DYE PENETRANT COMPOSITION AND METHOD UTILIZING SAME

Orlando G. Molina, Westminster, Calif., assignor to North American Rockwell Corporation, El Segundo, Calif.

Filed Feb. 5, 1973, Ser. No. 329,775
Int. Cl. G01n 21/16
U.S. Cl. 250—302 19 Claims



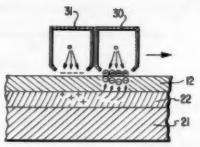

Method for detecting cracks and flaws in the surfact of an object or part, employing a dye penetrant composition which, following application of the dye penetrant composition to the part surface, includes means for facilitating removal of excess dye penetrant from such surface, in the form of a volatile degreaser-type solvent such as 1,1,1-trichloroethane. According to one embodiment an object to be inspected is immersed in a dye penetrant which will withstand high temperatures, particularly a dye penetrant containing an N-alkyl-2-pyrrolidone, for example N-methyl-2-pyrrolidone, and a dye which is soluble in said pyrrolidone, preferably a fluorescent dye, and including a volatile solvent, preferably 1,1,1-trichloroethane, the dye penetrant composition being maintained at the boiling temperature of the volatile solvent, causing vaporizing of such solvent into a zone above the heated liquid dye penetrant composition, removing the object from the heated liquid dye penetrant composition, passing the object into the zone containing vapors of the volatile solvent and maintaining the object in the vapor zone for a period sufficient to cause vapors of the volatile solvent contacting and condensing on the surface of the object, to wash excess liquid dye penetrant from the surface of the object back into the liquid dye penetrant composition, together with condensed vapors of volatile solvent, removing and drying the object. The process is conveniently carried out in a degreaser-type apparatus, in which the object is initially passed through the vapors of volatile solvent above the bubbling liquid dye penetrant composition in the bottom of the degreaser, permitting facile removal of any oil of or grease from the surface of the object, after which the object is then lowered into the liquid dye penetrant composition, then again passed upwardly through the vapors of volatile degreaser solvent to remove excess liquid dye penetrant and dried, as previously noted, following which the dried surface of the object containing dye penetrant in the cracks and defects thereof, with or without application of a developer, can be inspected under appropriate lighting conditions for detection of cracks and flaws.

## 3,789,222
## CORONA CHARGE METHOD

Masamichi Sato, Asaka, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Aug. 13, 1971, Ser. No. 171,690
Int. Cl. G03g 13/02
U.S. Cl. 250—325 7 Claims

A method for charging an electrophotographic member comprising a photoconductive insulating layer, an insulating substrate, and a conductive layer interposed between the photoconductive insulating layer and the insulating substrate, the conductive layer being unconnected to any source of reference electric potential, the method comprising the steps of relatively moving the electrophotographic member and two corona discharge electrodes, the first of which precedes the second, exposing the photoconductive insulating layer of the electrophotographic member to the first corona discharge electrode, the polarity of which is opposite to that of the majority carriers of the photoconductive insulating layer and

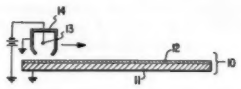



subsequently exposing the photoconductive insulating layer of the electrophotographic member to the second corona discharge, the polarity of which is the same as that of the majority carriers whereby the electrophotographic member is readily charged even though the conductive layer is unconnected to a source of reference electric potential.

## 3,789,223
## CHARGING METHOD FOR RELATIVELY MOVABLE ELECTROPHOTOGRAPHIC MEANS AND CORONA MEANS

Masamichi Sato, Asaka, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Aug. 11, 1971, Ser. No. 170,921
Claims priority, application Japan, Aug. 11, 1970, 45-70205
Int. Cl. G03g 13/02
U.S. Cl. 250—325 1 Claim




An electrophotographic coating provided on a highly insulating backing having a conductive interlayer can be uniformly charged in one polarity by forming a conductive path in a certain region of said coating by means of light exposure and on said conductive path applying a corona discharge of the opposite polarity whereby another corona electrode imparts corona ions of the first polarity, in which the coating is to be charged, on an area of the coating which is sufficiently close to the exposed area.

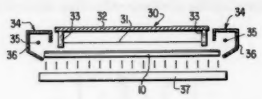
## 3,789,224
## PROCESS FOR CHARGING ELECTROPHOTOGRAPHIC MATERIALS

Masamichi Sato; Satoru Honjo, and Takao Komaki, all of Asaka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Sept. 17, 1971, Ser. No. 181,521
Claims priority, application Japan, Sept. 18, 1970, 45/81731
Int. Cl. G03g 13/02
U.S. Cl. 250—325 7 Claims

A process for charging electrophotographic material having a photoconductive insulating layer on a high insulating support which is characterized by simultaneously applying high voltages of opposite polarities respectively to a first corona discharge electrode facing the surface to be charged of the photoconductive insulating layer and second corona discharge electrode or electrodes facing a surface of the photoconductive insulating layer to cause corona discharges of the opposite

polarities to be applied to the photoconductive insulating layer and, no later than the corona discharge, uniformly irradiating the electrophotographic material through the support by a light which is absorbed by the photoconductive insulating layer and does not reach the surface of the photoconductive insulating layer.



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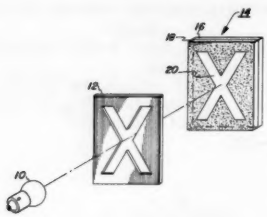
**3,789,225**

**PROCESS FOR PREPARING GLASSY LIQUID CRYSTALS AND METHOD FOR FORMING IMAGES ON SAME**

**Lewis B. Leder, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Aug. 24, 1971, Ser. No. 174,348**
**Int. Cl. G01t 1/16**
**U.S. Cl. 250—331** **22 Claims**



A process for preparing various glassy optically negative liquid crystalline materials and a method for forming images on these materials are described. The glassy liquid crystals are relatively hard films which retain the optical properties of the normally softer liquid crystalline compositions. These liquid crystalline materials are imaged by flash exposure to a burst of imagewise activating radiation followed by relatively rapid cooling. The heat from the energy of the activating radiation typically causes a change in the pitch of the liquid crystal in the exposed areas of the film and the new pitch is retained by the rapid cooling.

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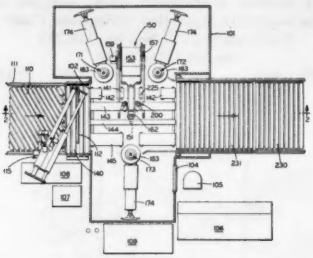
**3,789,226**

**X-RAY TIRE INSPECTION MACHINE**

**Donald T. Green, Mentor, and James L. Snarr, Eastlake, both of Ohio, assignors to Imagex, Inc., Mentor, Ohio**

**Filed Sept. 1, 1972, Ser. No. 285,743**
**Int. Cl. G01j 39/18**
**U.S. Cl. 250—360** **15 Claims**

An X-Ray tire inspection machine for automatic handling of tires and display of X-Ray shadow pictures of every part of the circumference of the tires includes devices for measuring each of a random succession of tires of differing sizes, positioning each tire in turn with the axis of an X-Ray imaging system in the mid-plane of the tire, spreading the beads of the tire sufficiently to avoid presence of more than one part of the tire in any ray of the X-Ray beam, stepwise rotation of the tire and successive display of X-Ray shadow pictures of each portion of the circumference of the tire while in a stationary position, marking the approximate location of each defect or other noteworthy observed feature and diversion of the marked tire, and dispatching toward their destinations the tires not marked for diversion. The machine may scan a single zone of the tire



such as the tread, or may scan tread and sidewalls successively with a single imaging system or simultaneously with a group of imaging systems.

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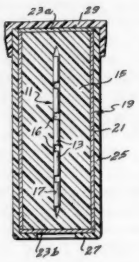
**3,789,227**

**ENVIRONMENTAL DOSIMETER OF THE THERMOLUMINESCENT TYPE**

**Fred N. Eichner, Kennewick, and Leo F. Kocher, Richland, both of Wash., assignors to The United States of America as represented by the United States Atomic Energy Commission, Washington, D.C.**

**Filed May 18, 1973, Ser. No. 361,757**
**Int. Cl. G01t 1/11**
**U.S. Cl. 250—484** **9 Claims**



A dosimeter for accurately monitoring normally low-energy radiation includes thermoluminescent CaF phosphors enclosed within a tantalum capsule. The tantalum acts as a filter to weaken the measured dose due to photons having energies below about 0.2 MeV. Tantalum end caps are maintained on the capsule body by a polyolefin sheath formed from heat-contractable tubing. After exposing the dosimeter to environmental radiation, it is placed in a shielded chamber for about 24 hours and subsequently annealed at about 80°C. to release radiation energy accumulated in low-temperature traps. The dosimeter is then disassembled and the phosphors photometrically read at temperatures about 80°C. to determine the absorbed radiation dose.

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**3,789,228**

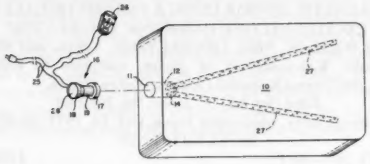
**STERILIZING APPARATUS**

**Joseph Bouchard, 341 Oklahoma St., Hollywood Beach, Fla.**

**Filed Oct. 12, 1972, Ser. No. 296,895**
**Int. Cl. H01j 37/00**
**U.S. Cl. 250—492** **4 Claims**

An air purifying and sterilizing means comprising an ultraviolet source coupled with a forced circulation means such as

a fan. The ultra-violet source and fan are adapted to be placed into a portion of a mattress or the like to thereby force feed thereinto a supply of air which has been subjected to the ef-



fects of the ultra-violet ray tube to thus sterilize the air and resultant sterilization of the mattress or the like in which the ray tube and fan assembly have been placed.

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**3,789,229**

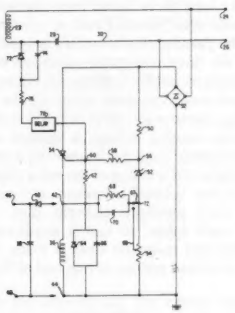
## WELDING CONTROL CIRCUIT AND METHOD

**Robert V. Jackson, Los Angeles, Calif., assignor to McCulloch Corporation, Los Angeles, Calif.**

**Division of Ser. No. 177,613, Sept. 3, 1971, abandoned. This application June 5, 1972, Ser. No. 259,930**

**Int. Cl. H02p** *9/04*

**U.S. Cl. 290—40** **9 Claims**



A voltage regulator and method are utilized in an automatic throttle control for an internal combustion engine driven inductor alternator. An SCR in series with the load is biased to conduct on successive positive half-cycles of a rectified a.c. input voltage. The SCR conductive bias is opposed responsively to the load voltage so that the average load voltage is a function of the number of complete pulses of the source in which the SCR conducts during a given time period. A hold-off circuit is provided to prevent SCR conduction during welding.

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**3,789,230**

## WELDING CURRENT GENERATOR HAVING TWO INTERCONNECTED SOURCES

**Serge Paulange, 12 Route de Vertori, Nantes, France**

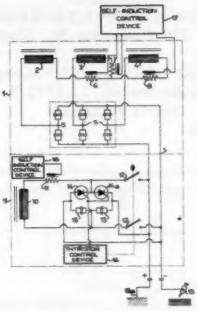
**Filed Sept. 29, 1972, Ser. No. 293,393**

**Claims priority, application France, Oct. 1, 1971, 71.36389**

**Int. Cl. H02j** *3/00*

**U.S. Cl. 307—1** **7 Claims**

Device adapted to provide welding current to automatic arc welding apparatus having a non-fusible electrode. The device comprises a first single-phase current source and a second three-phase current source having means associated with each source for controlling the strength of the current fed by the source. A first rectifier arrangement is connected to the three-phase source for rectifying the current fed by such source and a second rectifying arrangement including a periodic interrupter is connected to the output of the single-phase source for providing a pulsed current. The output of the first and



second rectifier arrangements are connected in parallel to the welding electrodes so as to permit superposition of the current fed by the first and second sources, and a switch is provided for short-circuiting the second rectifier arrangement for providing, when the switch is open, a pulsed current superposed on a direct current and, when the switch is closed, an alternating current superposed on the direct current.

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**3,789,231**

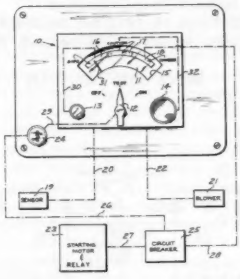
## VAPOR DETECTOR SAFETY SYSTEM

**Arthur G. Hayden, 1231 Sunset Loop, Walnut Creek, Calif.**

**Continuation-in-part of Ser. No. 198,555, Nov. 15, 1971, abandoned. This application Feb. 20, 1973, Ser. No. 333,517**

**Int. Cl. B63j** *2/06*

**U.S. Cl. 307—9** **5 Claims**



A combustible vapor detector system providing both a proportional visual reading and a simultaneous switching function in a common instrument includes a meter relay and a vapor sensor remotely located in a compartment likely to have an accumulation of combustible vapors which operably coupled to the meter relay to control its reading at an operator's console and a plurality of switching sectors associated with the meter relay arranged to sequentially operate several independent circuits within selected meter ranges so a "safe" or "caution" condition will be indicated with auxilliary elements, such as lights or audible elements, apart from the meter readings, and a "danger" condition will trigger a disabling circuit to stop or prevent the start-up of any machinery located in the com-

partment containing the sensor. The switching sectors may also be employed to operate a blower to purger the compartment of any accumulation of combustible vapors and the "-danger" condition can also be employed to shut off all electrically controlled machinery located in the compartment having the vapor sensor or elsewhere.

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**3,789,232**

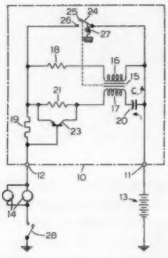
**FLASHER SWITCH WITH OUTAGE INDICATION**

**Kenneth Wareing, 370 Consession St., Hamilton, Ontario, Canada**

**Continuation-in-part of Ser. No. 179,300, Sept. 10, 1971, abandoned. This application Nov. 21, 1972, Ser. No. 308,626**

**Int. Cl. H02g** *3/00*

**U.S. Cl. 307—10 L S** **6 Claims**



A flasher switch of the type for flashing automobile lamps is provided with outage indication. In a particular embodiment employing two coils producing opposed magnetic forces in a core the change in rate is obtained by inserting or removing an impedance to produce an appreciable discrete change of flux in the core. Preferably the change of flux is such that the flashing rate is increased above the usual rate.

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**3,789,233**

**STATIC CONVERTER ARRANGEMENT**

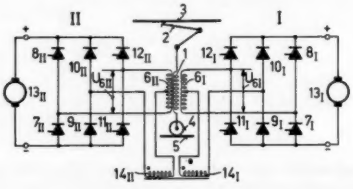
**Peter Winter, Baden, Switzerland, assignor to Brown Boveri & Company Limited, Baden, Switzerland**

**Filed Sept. 19, 1972, Ser. No. 290,410**

**Claims priority, application Switzerland, Oct. 11, 1971, 14712/71**

**Int. Cl. H02p** *7/68, 13/24*

**U.S. Cl. 307—17** **3 Claims**



A static converter arrangement comprises at least two converter units having substantially the same configuration and each of which includes at least two series-connected semi-controlled converter bridge circuits. At least two of such bridge circuits of one converter unit have an uncontrolled bridge portion in common and are connected to a tapped secondary winding of a transformer such that one top is connected to a circuit point between anode and cathode of the semi-conducter valves of the uncontrolled bridge portion via a choke. Thus the converter arrangement comprises at least two chokes, one for each connector unit, and these chokes are magnetically in reverse-series connection.

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**3,789,234**

**MAGNETIC SENSOR USING A PARAMETRICALLY EXCITED SECOND HARMONIC OSCILLATOR**

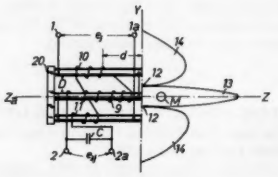
**Teruji Watanabe, Niza; Takasuke Fukui, Tokyo, and Shizuo Suzuki, Kawasaki, all of Japan, assignors to Kokusai Denshin Denwa Kabushiki Kaisha, Tokyo, Japan**

**Filed Oct. 16, 1972, Ser. No. 298,008**

**Claims priority, application Japan, Oct. 18, 1971, 46/82288**

**Int. Cl. G11c** *11/20*

**U.S. Cl. 307—88 P** **5 Claims**



A magnetic sensor using a parametrically excited second harmonic oscillator for detecting a minute magnetic field by utilizing a change in the phase of the second harmonic of the oscillator in accordance with the direction of an external magnetic field. At least three inductance elements each formed with a magnetic wire member and its winding are employed for forming the parametrically excited second harmonic oscillator, one of the three inductance elements being a main element and the others auxiliary elements, the auxiliary elements being disposed about the main element. The windings of the elements being interconnected in series in such a manner that when the same exciting voltage is applied to the magnetic members a magnetic field established by a second harmonic current flowing in the winding of the main element and a magnetic field by the second harmonic current flowing in the winding of each auxiliary element may be opposite in direction to each other, so that a sensitivity characteristic against an external magnetic field is made extremely sharp with respect to a head portion of one end of the main element.

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**3,789,235**

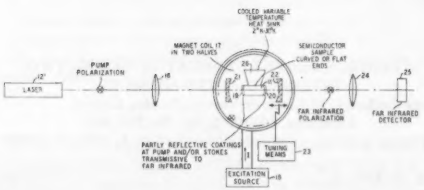
**FAR INFRARED COHERENT RADIATION SOURCE EMPLOYING CHARGE CARRIER SPIN NONLINEARITY IN A MAGNETIC FIELD**

**Thomas James Bridges, Holmdel, and Van-Tran Nguyen, Matawan Twp., Monmouth County, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, Berkeley Heights, N.J.**

**Filed Sept. 28, 1972, Ser. No. 292,875**

**Int. Cl. H02m** *5/06*

**U.S. Cl. 307—88.3** **16 Claims**



There are disclosed far infrared coherent radiation sources in which a sample of material capable of spin-flip transitions is

subjected to an adjustable magnetic field and pumped by at least one coherent light beam. Some of the sources generate both tunable spin-flip laser radiation and far infrared radiation at the tunable spin-flip (or spin resonance) frequency. Others of the sources provide mixing of two input coherent radiations of adjustable frequency to produce phase-matched far infrared coherent radiation at the difference frequency which substantially coincides with the spin-flip frequency. In all of these sources only one crystal of the material is typically subjected to the magnetic field. A particular advantage of these sources is the possibility of tuning the far infrared output over a wide frequency range. An important aspect of the invention is that phase-matching greatly enhances the far infrared output.

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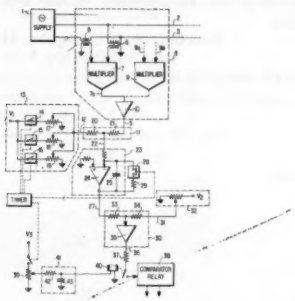
**3,789,236**

## DEVICE FOR MONITORING THE ELECTRICAL ENERGY DELIVERED BY AN ENERGY SOURCE

**Pierre Lacroix, Mazeres-sur-Salat, France, assignor to Societe de Travaux d'Electricite et d'Electronique du Languedoc**

**Filed Aug. 9, 1972, Ser. No. 279,235**
**Claims priority, application France, Aug. 9, 1971, 71.29300**
**Int. Cl. H02j** *7/22*
**U.S. Cl. 307—96** **6 Claims**



An apparatus for monitoring the energy supplied by a source to a load system including sensors which provide signals proportional to current and voltage to a multiplier which produces a signal proportional to instantaneous power. The power signal is compared with a reference and the difference is integrated over a preselected interval of time at the end of which the integrator is reset. The integrated signal is compared with a second reference and the difference is applied to a comparator. If the resulting signal exceeds a set limit an alarm is actuated or selected portions of the load are disconnected from the source. A delay circuit prevents actuation at the beginning of the integration.

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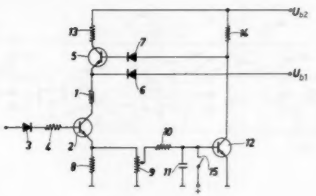
**3,789,237**

## DEVICE FOR RAPID SWITCHING OF INDUCTORS

**Gerhard Doring, Jena, Germany, assignor to Jenoptik Jena G.m.b.H., Jena, Gera, Germany**

**Filed Dec. 26, 1972, Ser. No. 318,066**
**Int. Cl. H01f** *27/42*
**U.S. Cl. 307—104** **5 Claims**

In a device for rapid switching of inductors, particularly for use in electric stepping relay drive mechanisms, the upper limiting frequency is increased by a shortening of the starting time. Two voltage sources of different voltages are applied for feeding a short timed high voltage into the inductor via a switching means for the current to rise steeply. When the current has reached its rated value, a considerably lower voltage is fed into the inductor via said switching means.



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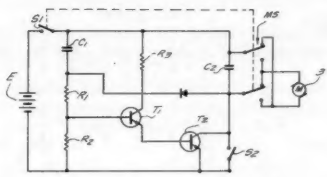
**3,789,238**

## OPEN SWITCH BYPASS CIRCUIT

**Shelley M. Presentey, 1268 Henry Farm Dr., Ottawa, Canada**

**Filed Apr. 11, 1973, Ser. No. 350,177**
**Int. Cl. H01h** *35/00*
**U.S. Cl. 307--119** **12 Claims**



A web transport arrangement, particularly a magnetic tape transport arrangement, includes a supply reel, an elongated web or magnetic tape wound on the supply reel and having one end secured to the supply reel. A reversible advancing unit includes an electric motor and is operative for advancing the web of magnetic tape in a first direction to unwind the web from the supply reel and is alternatively operative to advance the web in opposite second direction to rewind the web or tape onto the supply reel. The motor has a first motor current path and also has an auxiliary motor current path. The first motor current path includes a first switch and the auxiliary motor current path includes an axuiliary switch. A mode selector has at least first and second settings for respectively causing the advancing unit to advance the web in said first and second directions. A web-end-sensing unit is operative for opening the first switch to stop said advancing unit in response to an increase in web tension resulting upon substantially complete unwinding of the web from the supply reel. An overriding arrangement is operative, when said selector is in a setting other than said first setting, for closing the auxiliary switch, to permit the flow of motor current through the auxiliary motor current path.

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**3,789,239**

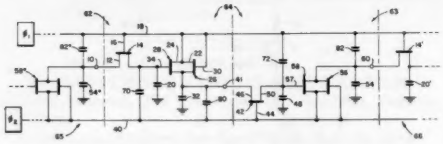
## SIGNAL BOOST FOR SHIFT REGISTER

**Richard H. Heeren, Palatine, Ill., assignor to Teletype Corporation, Skokie, Ill.**

**Filed July 12, 1971, Ser. No. 161,806**
**Int. Cl. G11c** *11/40*
**U.S. Cl. 307—221 C** **19 Claims**

A MOSFET shift register wherein capacitor nodes in each

cell of the register are charged and selectively discharged and having booster capacitor nodes and clock nodes to increase



slightly the voltages at the capacitor nodes in order to enhance the operation of the shift register.

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**3,789,240**

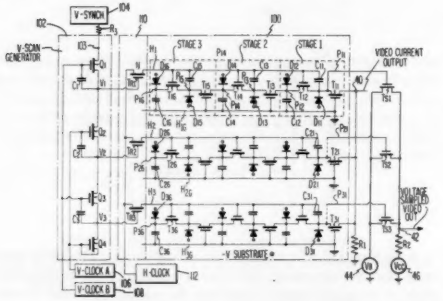
**BUCKET BRIGADE SCANNING OF SENSOR ARRAY**

**Paul Kessler Weimer, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.**

**Division of Ser. No. 83,923, Oct. 26, 1970, Pat. No. 3,683,193. This application May 26, 1972, Ser. No. 257,095**

**Int. Cl. H03k** *23/22*

**U.S. Cl. 307—223 C** **5 Claims**



A sensor array having photosensitive elements formed as an integral part of each stage of a shift register chain. Each stage has charge storage means. The photosensitive elements are coupled to the charge storage means for discharging them as a function of externally applied photo signals and, consequently, developing charge deficits in said charge storage means. The shift register, in response to a clocking signal, transfers the charge deficits from one stage to the next along the chain producing a serial output signal at an output terminal.

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**3,789,241**

**ELECTRONIC PULSE AMPLIFIER CIRCUITS**

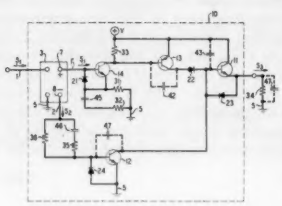
**William Emil Hess, Jr., Piscataway, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, Berkeley Heights, N.J.**

**Filed Apr. 2, 1973, Ser. No. 347,067**

**Int. Cl. H03k** *17/04*

**U.S. Cl. 307—255** **11 Claims**

An improved electronic pulse amplifier circuit, which features three transistors of different conductivity types configured in cascade to provide high-speed, high-power operation, is disclosed. Rapid removal of excess stored minority carriers from the base region of a saturated middle transistor, and rapid charging of the natural interelectrode capacitances of the middle transistor and an output transistor are effected by a fourth "pull-down" transistor, the collector of which is connected to both the collector circuit of the middle transistor and to the base of the output transistor. Only a single bias volt-



age source is required; and the magnitude of the bias voltage, which determines the amplitude of the output pulses, may be varied over a wide range as a simple means of controlling the power gain of the circuit.

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**3,789,242**

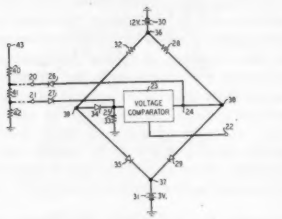
**OVERVOLTAGE AND UNDERVOLTAGE DETECTION CIRCUIT**

**Barry Ira Cantor, Boonton, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, Berkeley Heights, N.J.**

**Filed Dec. 26, 1972, Ser. No. 318,619**

**Int. Cl. H03k** *5/20, 5/18*

**U.S. Cl. 307—235 R** **2 Claims**



An overvoltage and undervoltage detector circuit is disclosed in which two reference voltage producing circuits have their dissimilar outputs applied to first and second input terminals of a voltage comparator. The dissimilarity of the inputs to the comparator is reversed when a first voltage exceeding a predetermined level forward biases a first diode and raises the potential on one of the comparator input terminals or a second voltage less than a predetermined level forward biases a second diode and lowers the potential on the other comparator input terminal.

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**3,789,243**

**MONOLITHIC MEMORY SENSE AMPLIFIER/BIT DRIVER HAVING ACTIVE BIT/SENSE LINE PULL-UP**

**Nicholas M. Donofrio, and Douglas W. Kemerer, both of Essex Junction, Vt., assignors to International Business Machines Corporation, Armonk, N.Y.**

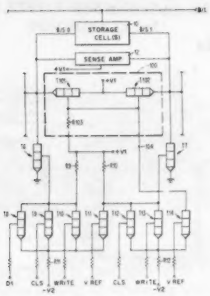
**Filed July 5, 1972, Ser. No. 268,988**

**Int. Cl. H03k** *5/08*

**U.S. Cl. 307—238** **5 Claims**

The specification describes a sense amplifier/bit driver circuit having an active bit/sense line pull-up circuit. The active pull-up circuit is shown substantially as two transistors connected between the bit driver circuit and the bit/sense lines. A

normal write operation is performed by pulling one bit/sense line to a down level (ground) potential and retaining the other bit/sense line at an up level (positive) voltage. Immediately after the write operation, recovery time is required to bring the down level bit/sense line back to the up level for subsequent read/write operations. The pull-up circuit described in the specification is turned on to perform this function and maintained off in order not to interfere with other operations.



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**3,789,244**

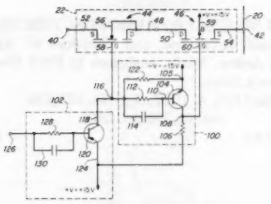
**FET ANALOG MULTIPLEX SWITCH**

**Salvatore R. Provanzano, East Boston, Mass., assignor to Spacetac Incorporated, Bedford, Mass.**

**Filed Sept. 8, 1972, Ser. No. 287,535**

**Int. Cl. H03k** *17/60*

**U.S. Cl. 307—251** **7 Claims**



An FET analog switching circuit, including an input terminal and an output terminal, first and second FET's connected together with their primary electrodes connected in series between the input terminal and the output terminal, one of the first and second FET's being an N type and the other being a P type, and means for selectively applying a switching signal of one polarity to the gate of the first FET to turn on the first FET and of the opposite polarity to the gate of the second FET to simultaneously turn on the second FET.

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**3,789,245**

**TERNARY MEMORY CELL**

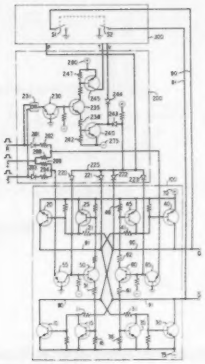
**Herbert Anton Schneider, Boulder, Colo., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, Berkeley Heights, N.J.**

**Filed Dec. 26, 1972, Ser. No. 318,208**

**Int. Cl. H03k** *3/286, 3/29*

**U.S. Cl. 307—288** **11 Claims**

A two-state regenerative circuit comprising two complementary transistor pairs, i.e., a complementary cell is provided with a third state by an arrangement which, in response to a predetermined signal, latches the cell in a state, otherwise unstable, in which both transistor pairs are nonconductive. A switching circuit provides the cell with low output impedance in the third state.



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**3,789,246**

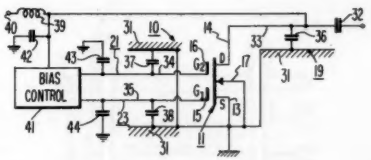
**INSULATED DUAL GATE FIELD-EFFECT TRANSISTOR SIGNAL TRANSLATOR HAVING MEANS FOR REDUCING ITS SENSITIVITY TO SUPPLY VOLTAGE VARIATIONS**

**Joseph Otto Preisig, Trenton, and Adolph Presser, Kendall Park, both of N.J., assignors to RCA Corporation, New York, N.Y.**

**Continuation-in-part of Ser. No. 159,777, July 6, 1971, abandoned. This application Feb. 14, 1972, Ser. No. 226,227**

**Int. Cl. H03k** *3/26*

**U.S. Cl. 307—304** **9 Claims**




An oscillator circuit is described using a dual gate MOS-FET transistor. Drift of the oscillating frequency of the oscillator circuit caused by drain supply voltage variations is minimized by suitable bias voltages applied to the two gates. The gate bias voltages are derived from the same principle supply, but the gate voltage variations must be nonlinear with respect to the drain voltage variations to achieve frequency stability. The suitable gate voltages are achieved by means of a voltage divider composed of dual gate MOS-FET transistors.

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**3,789,247**

**DYNAMICALLY ORDERED BIDIRECTIONAL SHIFT REGISTER HAVING CHARGE COUPLED DEVICES**

**William F. Beausoleil, Hopewell Junction; Irving T. Ho, Poughkeepsie, and Hwa Nien Yu, Yorktown Heights, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

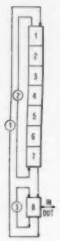
**Filed July 3, 1972, Ser. No. 268,342**

**Int. Cl. H01l** *11/14*

**U.S. Cl. 307—304** **6 Claims**

The specification describes charge coupled devices in a bidirectional shift register and having a dynamic ordering capability. Charge coupled devices are shown in a semicon-

ductor structure with FET amplifying circuits, uniquely adapted for bidirectional operation by means of a circuit which changes the order of occurrence of the clocking pulses.



The density of charge coupled devices is preserved together with improved access time resulting from bidirectional operation and dynamic ordering.

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3,789,248

**HOLDER MEMBER FOR A SEMICONDUCTOR ELEMENT**

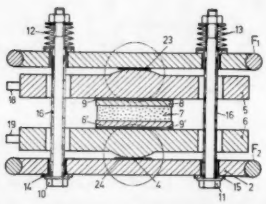
**Andre Jaecklin, Goldwandstrasse 35, Ennetbaden, and Otto Scharli, Muhlbergweg 2, Baden, both of Switzerland**

**Filed July 18, 1972, Ser. No. 272,729**

**Claims priority, application Switzerland, July 20, 1971, 10713/71**

**Int. Cl. H01v** *7/00*

**U.S. Cl. 310—9.4** **6 Claims**



A holder for a semiconductor element includes a pair of spaced support plates each resiliently biased against one of a pair of pressure plates which are located between the support plates. The semiconductor element is held between the pressure plates. The contacting surfaces of the support plates and the pressure plates each has a different radius of curvature. Various embodiments of the contacting surfaces of the support plates and the pressure plates include a convexly shaped projection on one with a convex, concave or planar surface on the other. Further, the contacting surfaces can be provided by an intermediate member positioned between the oppositely facing plates and with the intermediate member having a convex or spherically shaped contacting surface. The contacting surfaces are arranged for transforming a part of the kinetic energy developed under dynamic mechanical stress into frictional heat, such as by providing at least one of the contacting surfaces with a coefficient of friction between 0.025 and 0.3. In a preferred embodiment at least one of the contacting surfaces is provided with a coating of titanium carbide.

3,789,249

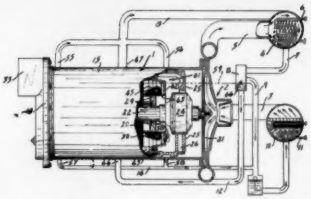
**APPARATUS FOR COOLING A HERMETIC MOTOR**

**Joseph W. Purman, Milwaukee, Wis., assignor to The Louis Allis Company, Milwaukee, Wis.**

**Continuation of Ser. No. 107,177, Jan. 18, 1971, which is a continuation-in-part of Ser. No. 38,269, May 18, 1970, abandoned. This application Sept. 5, 1972, Ser. No. 286,421**

**Int. Cl. H02k** *9/20*

**U.S. Cl. 310—54** **11 Claims**



A hermetically sealed electric motor suitable for use in a refrigeration system has an annular chamber formed about the stator. The chamber is filled with a coolant, such as the system refrigerant. A selected portion of the coolant is supplied by a pipe from the annular chamber to a channel formed by a stationary baffle. A rotor fan located in the channel distributes coolant circumferentially around the motor gap and urges axial flow of the coolant through the gap. Additionally, a dispensing outlet may be formed in the annular chamber to allow coolant to flow to the rotor assembly at the rotor end opposite the channel.

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3,789,250

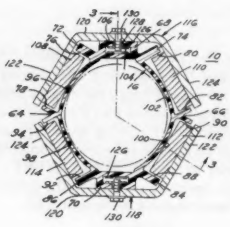
**PERMANENT MAGNET DYNAMOELECTRIC MACHINE**

**Arthur J. Macoit, Riverview, and Theodore G. Apostoleris, both of Ann Arbor, Mich., assignors to Ford Motor Company, Dearborn, Mich.**

**Filed Feb. 4, 1972, Ser. No. 223,636**

**Int. Cl. H02k** *23/04*

**U.S. Cl. 310—154** **10 Claims**



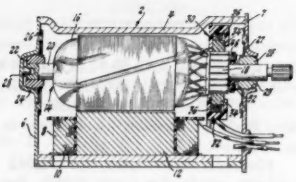
A permanent magnet dynamoelectric machine including an armature or rotor and a plastic cup-shaped housing having a substantially cylindrical inner surface portion with means for rotatably supporting the armature or rotor within the substantially cylindrical inner surface of the housing. Four permanent magnets and two ferromagnetic flux path members are mounted in assembled relationship either on the outer surface of the cup-shaped housing or molded within the plastic cup-shaped housing so that plastic material is interposed between the armature or rotor and the permanent magnets.

3,789,251

## SPRING ARM BEARING RETAINER

Dallas E. King, Dayton, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Feb. 22, 1973, Ser. No. 334,677
Int. Cl. H02k *13/00*
U.S. Cl. 310—239 4 Claims



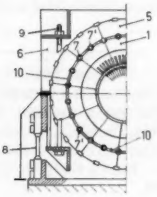
A spring arm bearing retainer performs three functions in a dynamoelectric machine having an armature with a shaft and commutator rotatably supported in a frame and a "floating" brush assembly on the shaft. The main body of the retainer attached to the frame holds a bearing supporting one end of the shaft; and a pair of spaced, parallel, resilient arms projecting from one side of the main body and bent back between the latter and the brush assembly engage the brush assembly to provide axial thrust for the armature against a thrust bearing on the opposite end of the shaft and act as stops to prevent the rotation of the brush assembly with the armature.

3,789,252

## TWO-PART STATOR FOR LARGE ROTATING ELECTRICAL MACHINES

Karl Abegg, Oberrieden, Switzerland, assignor to Aktiengesellschaft Brown, Boveri & Cie, Baden, Switzerland

Filed Feb. 14, 1972, Ser. No. 225,991
Claims priority, application Switzerland, Feb. 24, 1971, 2639/71
Int. Cl. H02k *1/12*
U.S. Cl. 310—259 6 Claims



A two-part stator for large rotating electrical machines which consists of an outer non-wound stator part sub-divided in the axial direction into annular laminated sections and a unitary inner laminated part to which the winding is applied.

3,789,253

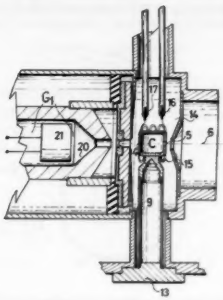
## CRUCIBLE FOR VAPORIZING CHEMICALLY ACTIVE ELEMENTS METHOD OF MANUFACTURING THE SAME AND ION SOURCE INCLUDING SAID CRUCIBLE

Jacques Kervizic; Rene Masic; Arvind Shroff, and Robert Jean Warnecke, all of Paris, France, assignors to Thomson-CSF, Paris, France

Filed June 22, 1972, Ser. No. 265,303
Claims priority, application France, July 6, 1971, 7124682
Int. Cl. H05h *1/02*
U.S. Cl. 313—63 4 Claims

The invention relates to ion sources having two ionization chambers and more particularly to chemical and heat resistant crucibles for use with said sources.

The crucible in accordance with the invention is a hollow box of pyrolytic tungsten having two opposite openings in its



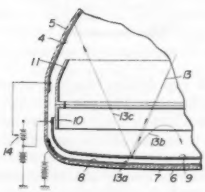
lateral wall. The crucible is manufactured from a pyrolytic tungsten deposite made on a copper mandrel which is dissolved in an etching bath.

3,789,254

## POST-DEFLECTION FOCUSING TYPE COLOUR CATHODE RAY TUBE

Eiichi Yamazaki, Ichihara, and Hiromi Kanai, Mobara, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 28, 1971, Ser. No. 212,967
Claims priority, application Japan, Dec. 28, 1970, 45/120466
Int. Cl. H01j *29/46*
U.S. Cl. 313—85 S 2 Claims



In a post-deflection focusing type colour cathode ray tube of the type comprising a shadow mask, a phosphor film formed on the inner surface of the face plate of the tube, a metal back electrode formed on the phosphor film for establishing a high intensity electric field between the metal back electrode and the shadow mask, and an electrode film formed on the inner surface of the funnel of the tube, a source of potential is connected between the shadow mask and the electrode film for applying a potential to the electrode film about 30 to 800 volts higher than the potential of the shadow mask.

3,789,255

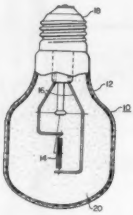
## NON-SAG INCANDESCENT TUNGSTEN FILAMENT FOR AN INCANDESCENT LAMP

Heinz G. Sell, Cedar Grove, N.J., and Heinz-J. Stepper, Konigsbrunn, Germany, assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Jan. 12, 1972, Ser. No. 217,162
Int. Cl. H01k *1/04*
U.S. Cl. 313—217 6 Claims

Incandescent lamp incorporates a non-sag tungsten filament having a microstructure comprising a plurality of elongated

and interlocking grains disposed along the axial dimension of the filament. A large number of very minute inert gas bubbles, such as helium bubbles, are included within the filament, and a portion of the bubbles are generally aligned along the axial dimension of the filament and are positioned at the boundaries




of the interlocking grains which comprise the filament. In the method for making the filament, inert gas atoms, such as helium atoms, are formed within the tungsten and when the filament is incandesced, the atoms migrate to form the very minute helium bubbles.

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**3,789,256**

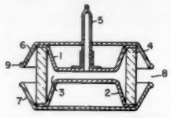
**SHIELDED SPARK GAP DEVICE**

**Norman K. Osmundsen, Bloomington, Ind., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed May 3, 1972, Ser. No. 250,000**

**Int. Cl. H01j** *1/52*

**U.S. Cl. 313—313** **10 Claims**




A shielded spark gap device which is essentially independent of external influences. The gap is enclosed in a metallic shielding enclosure which is discontinuous between opposite ends of the gap, so as to provide a capacitance in parallel with the gap, and which shields the gap in such a manner that its sparkover characteristics are not affected by any change in external conditions which may affect the electric field in the region of the gap.

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**3,789,257**

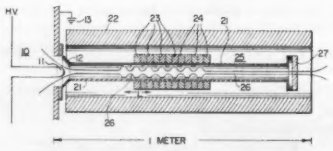
**COHERENT MICROWAVE GENERATORS**

**Moshe Friedman, and Melvin Herndon, both of Washington, D.C., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Nov. 14, 1972, Ser. No. 306,466**

**Int. Cl. H01j** *23/16, 29/96*

**U.S. Cl. 315—3** **7 Claims**




A device for producing intense electromagnetic radiation from the interaction of an intense relativistic electron beam and a spatially modulated magnetic field in combination with a homogenous magnetic field region. The device is magnetically tuneable and capable of producing high level radiation of narrow or wide bandwidth over an extremely large range of wavelengths. The device produces microwave energy of the order of $10^8$ to $10^9$ watts in the 3 cm to 1 mm wavelength region with a secondary objective to produce electromagnetic energy of the order of $10^8$ watts at wavelengths shorter than 1 mm.

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**3,789,258**

**ELECTRON BEAM AND DEFLECTION YOKE ALIGNMENT FOR PRODUCING CONVERGENCE OF PLURAL IN-LINE BEAMS**

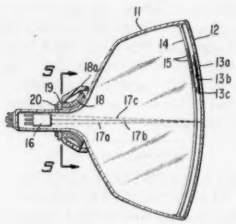
**Robert Lloyd Barbin, Lancaster, Pa., assignor to RCA Corporation, New York, N.Y.**

**Filed Apr. 20, 1972, Ser. No. 245,862**

**Claims priority, application Great Britain, Jan. 14, 1972, 01779/72**

**Int. Cl. H01j** *29/50*

**U.S. Cl. 315—13 CG** **8 Claims**




In a color television display system in which a plurality of horizontal in-line electron beams are directed toward color phosphor elements of a color picture tube, substantial convergence of the beams at all points on a scanned raster is achieved by transversely positioning the deflection yoke relative to the picture tube while maintaining substantial parallelism between the central longitudinal axes of the yoke and picture tube.

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**3,789,259**

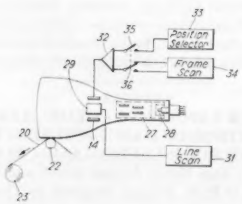
**CATHODE RAY TUBES TO FACILITATE RECORDING**

**Gordon S. J. Allen, Essex, England, assignor to Forward Technology Limited, London, England**

**Filed May 8, 1972, Ser. No. 251,299**

**Int. Cl. H01j** *29/70*

**U.S. Cl. 315—21 PR** **11 Claims**




A cathode ray tube with a conventional screen for providing a visible monitoring image is additionally formed with a second output portion on its envelope, the second output portion including a multiplicity of fibre-optics, electrically conductive particles, or other elements for transferring elements

of the image from the internal surface of the envelope wall to the external surface to facilitate recording of an image on a sensitised sheet presented to the external surface. Deflection means guide a recording beam either to the monitoring screen or to the second output portion of the envelope, as required, or alternately to the two output portions of the envelope in rapid succession.

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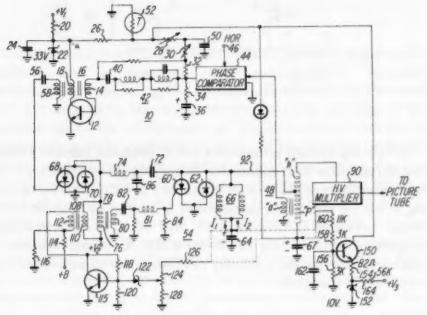
### 3,789,260
### HIGH VOLTAGE PROTECTION CIRCUIT

**Paul Raymond Ahrens, Indianapolis, Ind., assignor to RCA Corporation, New York, N.Y.**

**Continuation of Ser. No. 121,250, March 29, 1971, abandoned. This application Mar. 23, 1973, Ser. No. 344,065**

**Int. Cl. H01j** *29/70*

**U.S. Cl. 315—22** **7 Claims**




Loss of high voltage regulation in a television receiver can cause an increase in the ultor voltage developed for its picture tube and an increase in the possibility of X-radiation. The described circuit senses the loss of such regulation by detecting high voltage increases beyond a predetermined value and by changing the frequency of the horizontal oscillator, in response, to render the reproduced picture unviewable.

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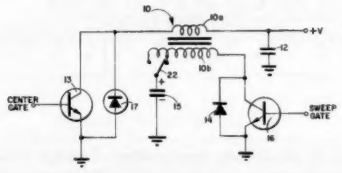
### 3,789,261
### RADAR SWEEP GENERATOR

**George P. Cooper, Corona Del Mar, Calif., assignor to North American Rockwell Corporation, Anaheim, Calif.**

**Filed Apr. 6, 1972, Ser. No. 241,619**

**Int. Cl. H01j** *29/70*

**U.S. Cl. 315—27 TD** **11 Claims**




A sweep generator for a displaced-center sector-scan display of a radar system, in which the inductance of the cathode ray tube display device cooperates with a storage capacitor for directly generating a bipolar sweep current waveform utilized by the control yoke. A centering gate responsive to the radar timing, energizes the winding to start the sweep from a filter capacitor of the power supply. During a first polarity portion of the sweep the energized winding is storingly discharged into the capacitor and during the oppositely-polarized second portion of the sweep, a sweep gate allows discharge of the capacitor back into the winding. The winding energy is then discharged at the end of the sweep back into the filter capacitor of the power supply, whereby a very low-power source may be utilized for energizing the sweep generator.

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### 3,789,262
### SAWTOOTH SCAN CIRCUIT WITH HOLD FEATURE

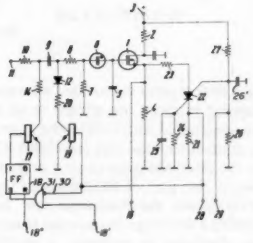
**Johannes Backwinkel, Hildesheim, Germany, assignor to Blaupunkt-Werke GmbH, Hildesheim, Germany**

**Filed Sept. 11, 1972, Ser. No. 287,754**

**Claims priority, application Germany, Sept. 22, 1971, 2147228**

**Int. Cl. H01j** *29/70*

**U.S. Cl. 315—27 TD** **16 Claims**



A gas discharge tube isolates the storage condenser of a sawtooth wave generator of an electronic tuning device from the pulses that charge it up and, more rapidly, discharge it in a scanning cycle. A first electronic switch grounds a clamping diode to reverse the polarity of the pulses and thus discharge the storage condenser. A second electronic switch provides a hold function by reducing the amplitude of the charging pulses (taken from a TV line scanning flyback circuit) so that they cannot fire the gas discharge tube.

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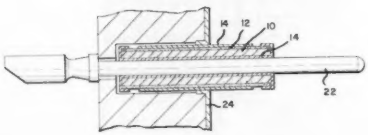
### 3,789,263
### RF FILTERS WITH GLASS ON A SUBSTRATE

**William Baird Fritz, Hershey; John Wayne Tiley, Hatboro, and Neil Harrison Sanders, Carlisle, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.**

**Filed Feb. 4, 1972, Ser. No. 223,624**

**Int. Cl. H01j** *23/20*

**U.S. Cl. 315—39.51** **9 Claims**



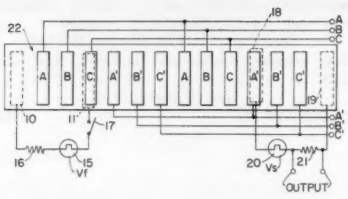
A low pass RF filter for high voltage feed-through to the filament of a magnetron. The filter comprises a ferrite substrate in the form of a sleeve with the outer surface of the sleeve carrying a dielectric layer comprising a lead oxide glass. The dielectric layer also comprises aluminum oxide to provide a rough surface for metal plating without increasing the coefficient of thermal expansion of the dielectric layer relative to the ferrite substrate.

3,789,264

## PLASMA SHIFT REGISTER WITH OVERLAPPING GLOW

John L. Janning, Dayton, Ohio, assignor to The National Cash Register Company, Dayton, Ohio

Filed Nov. 10, 1972, Ser. No. 305,371
Int. Cl. H03k 23/38
U.S. Cl. 315—84.6 5 Claims




A plasma gas shift register is provided wherein pairs of electrodes overlapping in space are affixed to an insulating substrate and are overcoated with a dielectric layer. A plasma gas is sealed into contact with the dielectric layer. Clocked signals connected to the electrode pairs cause a shift of any discharge existing between one pair of electrodes to the next pair of electrodes overlapping the discharge pair. Input electrode means for causing a discharge in response to one state of input signal and no discharge in response to another state of an input signal are placed opposite the first pair of overlapping in space electrodes. Output electrode means are positioned opposite the last pair of overlapping in space electrodes to detect the presence or absence of a discharge between the last pair of overlapping electrodes.

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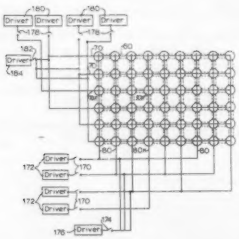
3,789,265

## DISPLAY PANEL

George E. Holz, North Plainfield, N.J., and James Ogle, Paoli, Pa., assignors to Burroughs Corporation, Detroit, Mich.

Continuation-in-part of Ser. No. 881,660, Dec. 3, 1969, abandoned. This application Oct. 4, 1971, Ser. No. 186,415
Int. Cl. H05b 37/00
U.S. Cl. 315—169 TV 10 Claims



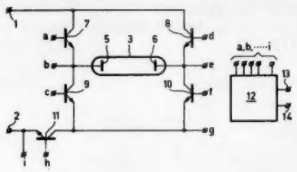

A display panel includes a plurality of rows and columns of display cells, each having an anode and a cathode and including a novel drive arrangement for selecting and energizing one cell at a time.

3,789,266

## ARRANGEMENT PROVIDED WITH A LOW-PRESSURE VAPOUR DISCHARGE LAMP

Jan Polman; Jan Evert Van Der Werf, and Peter Cornelis Drop, all of Emmasingel, Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed May 2, 1972, Ser. No. 249,526
Claims priority, application Netherlands, May 8, 1971, 7106345
Int. Cl. H05b 37/02
U.S. Cl. 315—194 5 Claims




A lighting system comprising a low pressure mercury vapor discharge lamp with means for supplying an intermittent current flow therein. The lamp efficiency is increased by operating it with a maximum pressure of 6 Torr, a duty cycle in the range between 0.35 and 0.65 and at a special switching frequency in the order of 30–60 KHz. A further feature includes means for periodically reversing the direction of current flow in the lamp.

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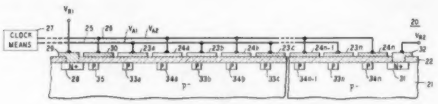
3,789,267

## CHARGE COUPLED DEVICES EMPLOYING NONUNIFORM CONCENTRATIONS OF IMMOBILE CHARGE ALONG THE INFORMATION CHANNEL

Robert Harold Krambeck, South Plainfield, and Robert Henry Walden, Berkeley Heights, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, Berkeley Heights, N.J.

Filed June 28, 1971, Ser. No. 157,509
Int. Cl. H01l 11/14
U.S. Cl. 317—235 R 9 Claims

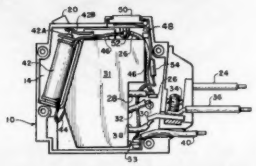



To ensure predictable directionality of charge transfer in two-phase charge coupled devices (CCD'S), the potential well associated with each half-bit must be asymmetrical so as to enhance charge transfer in the desired direction and to inhibit transfer in undesired directions. In the instant invention, localized portions of immobile charge are disposed under the CCD electrodes and, advantageously, offset with respect to the centers of the electrodes so that suitably asymmetrical potential wells are formed when a suitable voltage is applied to the electrodes. In a presently preferred embodiment, the immobile charge is provided by relatively highly doped surface zones in a semiconductor bulk portion of relatively low doping.

## 3,789,268
## MINIATURE CIRCUIT BREAKER WITH ELECTRONIC TRIPPING MEANS

Keith W. Klein, Simsbury, Conn., assignor to General Electric Company, New York, N.Y.

Filed Dec. 29, 1972, Ser. No. 319,759
Int. Cl. H02h 3/26
U.S. Cl. 317—18 D 12 Claims



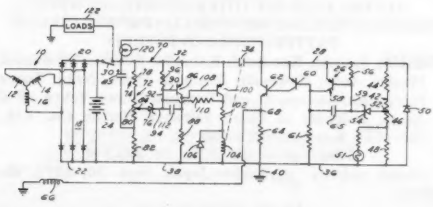
A small electric circuit breaker of the type having separable contacts and a manually and automatically operable mechanism for operating the contacts. In addition to the usual prior art automatic operating means, causing opening of the contacts upon the occurrence of predetermined current or voltage magnitude conditions, the circuit breaker includes means for detecting minute ground fault conditions, such as five milliamperes (5 ma.) and for tripping the circuit breaker on the occurrence of such a ground fault. The means for detecting such minute ground fault conditions and for tripping the circuit breaker in response thereto includes signal generating means such as a differential transformer, solid state electronic circuitry, for processing the ground fault signal, and a tripping solenoid. The signal generating means and the electronic circuitry are preferably pre-assembled in a sub-assembly or "ground fault sensing module," before assembly into the circuit breaker.

In accordance with the invention, assembly, testing, and salvaging of parts of the ground fault sensing module are facilitated by embedding or "potting" certain portions in the module housing, such as signal-generating transformers, and removably mounting certain other portions, such as electronic signal processing components, at least until certain critical testing of the module is completed. Following such testing, all components may be embedded or "potted" or, in the alternative, the module may be assembled into the circuit breaker without further potting of components.

## 3,789,269
## OVERVOLTAGE PROTECTION CIRCUIT

John A. Holm, Dearborn, and David A. Lapinski, Detroit, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Apr. 13, 1970, Ser. No. 27,560
Int. Cl. H02h 3/20
U.S. Cl. 317—23 10 Claims

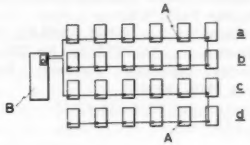



An electrical circuit means for protecting an electrical system from excessive voltage generated by an electrical energy generator that is particularly suited for use in an automotive vehicle. A regulator is connected to the output windings of an electrical energy generator and to the control winding for limiting the energization of the control winding and the magnitude of the voltage produced in the output windings. A solid state switching network is coupled to the output windings of the generator and the regulator for decoupling the output windings from the regulator when the voltage produced in the output windings exceeds a first predetermined level and for maintaining the output windings decoupled from the regulator until the voltage produced in the output windings falls to a second substantially lower predetermined level.

## 3,789,270
## WIRING SYSTEM FOR GROUP TESTING APPARATUS

Hiroshi Yamamoto, Tokyo, Japan, assignor to Kabushiki Kaisha Synapse, President Hiroshi Yamamoto, Tokyo, Japan

Filed Nov. 9, 1971, Ser. No. 196,953
Claims priority, application Japan, Nov. 21, 1970, 45/102949
Int. Cl. G09b 5/00
U.S. Cl. 317—99 5 Claims

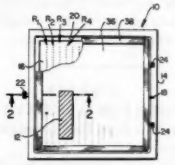



A method of forming wire lines and wiring members used therefor for a group tester comprising wire lines linking a master unit and subsidiary units thereof and wires for the subsidiary units both of which are constituted at the same time, the said master unit accumulating test results by connecting in series the wiring members having the said subsidiary units coupled therewith, as response units for examinees who receive tests.

## 3,789,271
## CIRCUIT BOARD ASSEMBLY

James J. Johnston, Cheshire, Conn., assignor to Automatic Equipment Development Corporation, West Haven, Conn.

Filed Nov. 29, 1972, Ser. No. 310,650
Int. Cl. H05k 1/04
U.S. Cl. 317—101 CC 14 Claims



A circuit board assembly comprising a frame having a stack of printed circuit boards mounted in fixed position thereon and having circuit means associated therewith. Each circuit board carries a plurality of resilient electrically conductive pin connectors which project from opposite surfaces thereof and extend through other circuit boards which comprise the stack. A pressure plate supported on the frame in generally parallel relation to the stack includes another circuit board which has circuit means and holes therethrough which receive the pins associated with the stack. Each hole defines a clamping sur-

face and has a cross-sectional area substantially greater than the cross-sectional area of an associated portion of a pin received therein. The pressure plate is supported for shifting movement in one and an opposite direction relative to the frame and transversely of the pins between open and closed positions. When the pressure plate is in its open position, a lead of an associated circuit component may be freely inserted into each hole between the clampin surface thereof and the pin received therein. When the pressure plate is in its closed position, the clamping surface exerts a biasing force on the loead and on the pin associated therewith to clamp the lead in electrically connected engagement with the pin and clamping surface to establish electrical circuit continuity between the leads and circuit means associated with the various circuit boards. A clamping screw on the frame is provided for moving th pressure plate to and releasably retaining it in its closed position.

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**3,789,272**

**CIRCUIT ARRANGEMENT FOR RHYTHMIC, INTERMITTENT OPERATION OF SEPARATE MAGNETS**

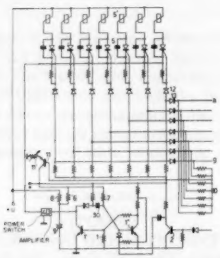
**Dietrich Vollhardt, Bremen, Germany, assignor to U.S. Philips Corporation, New York, N.Y.**

**Continuation of Ser. No. 30,648, April 22, 1970. This application Aug. 31, 1972, Ser. No. 285,437**

**Claims priority, application Germany, May 6, 1969, 1922752; May 3, 1969, 1923037**

**Int. Cl. H01h** *47/32*

**U.S. Cl. 317—137** **8 Claims**



A triggering circuit for a plurality of printing solenoids that insures the uniform density of the printed matter by producing actuating pulses of a duration varying as an inverse function of the supply voltage. The natural energy integration of printing solenoids causes the solenoid to print with a uniform force in response to short-duration, high voltage energization, and long-duration, low voltage energization.

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**3,789,273**

**LATCH MECHANISM FOR MEMORY DISC CARTRIDGE**

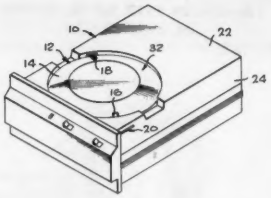
**Terence J. O'Brien, San Jose, Calif., assignor to Caelas Memories, Inc., San Jose, Calif.**

**Filed Sept. 11, 1972, Ser. No. 288,062**

**Int. Cl. G11b** *23/04*

**U.S. Cl. 317—141 R** **7 Claims**

A disc drive with a cover hold-down mechanism for preventing energization of the drive motor unless the cover of the disc pack is installed properly. The hold-down mechanism includes a pair of brackets pivotally mounted about vertical axes and a pair of arms pivotally mounted about horizontal axes on the brackets. After a disc pack cover is installed, the brackets are pivoted to move the arms over the cover, and the arms pivot upwardly over a beveled periphery of the cover. A switch prevents energization of the drive motor if the arms are not raised. The arms will not be raised if no cover is installed or if the cover is too high for the arms to rise over the beveled cover surface, and in either case, the motor will not be energized. A mechanism for preventing removal of the cover until




the motor has come to a full stop, includes a time delay circuit that releases the hold-down mechanism after a predetermined period which is slightly greater than the time required for the motor to coast to a stop.

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**3,789,274**

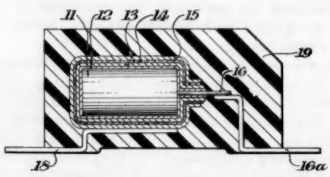
**SOLID ELECTROLYTIC CAPACITORS HAVING HARD SOLDER CATHODE COATING**

**William J. Pfister, Cheshire, and George A. Shirn, Williamstown, both of Mass., assignors to Sprague Electric Company, North Adams, Mass.**

**Filed July 24, 1972, Ser. No. 274,525**

**Int. Cl. H01g** *9/05, 9/06*

**U.S. Cl. 317—230** **9 Claims**




A solid electrolytic capacitor has an electrically conductive counterelectrode system that can advantageously be contacted without the use of flux, and can subsequently be used for high temperature applications, without any accompanying deterioration or corrosion difficulties. The counterelectrode system employs a sprayed layer of a high melting tin-lead alloy in contact with a coating of carbon on the solid electrolyte. The tin-lead carbon contacting layer can advantageously have a lead content of 95 percent by weight, thereby insuring a relatively high melting point therefor.

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**3,789,275**

**ALTERNATOR RECTIFIER ASSEMBLIES WITH RESINOUS MOLDED MEMBER CONTAINING CIRCUIT PATTERN MOLDED THEREIN**

**Takahiro Sawano, Kawasaki; Katuhiko Kubota, Yokohama; Masaru Ando, Kawasaki; Moriyasu Wada, Naka; Tohru Murayama, Kawaguchi, and Tadayuki Ozawa, Tokyo, all of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Saiwai-ku, Kawasaki-shi, Japan**

**Filed Sept. 27, 1972, Ser. No. 292,544**

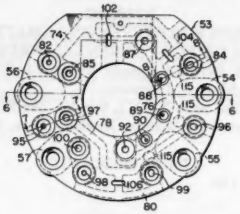
**Claims priority, application Japan, Sept. 30, 1971, 46-89451**

**Int. Cl. H01l** *8/00, 5/00*

**U.S. Cl. 317—234 R** **17 Claims**

In a semiconductor rectifier assembly of the type wherein lead wires of rectifier elements are electrically connected to a circuit pattern of an insulative substrate there are provided an

annular substrate of resinous moulded member containing a conductive sheet with a circuit pattern, a pair of sector shaped plate electrodes secured to the legs of the substrate, and a plurality of semiconductor rectifier elements. One of the electrodes of the rectifier elements is connected to the plate electrode and the other electrode is connected to the circuit pattern through a lead wire extending through the substrate.



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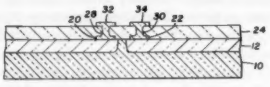
**3,789,276**
**MULTILAYER MICROELECTRONIC CIRCUITRY TECHNIQUES**

**David R. Sivertsen, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.**

**Division of Ser. No. 744,983, July 15, 1968, Pat. No. 3,453,723. This application Aug. 6, 1970, Ser. No. 61,797**
**Int. Cl. H01l *19/00***
**U.S. Cl. 317—235 R** **10 Claims**



A microelectronic circuit fabrication technique where an electron beam forms hillocks of single crystal material through a dielectric layer from a single crystal substrate. A single crystal is then grown atop each hillock over the dielectric layer by first epitaxially depositing material using the hillock as a nucleation site. The epitaxially deposited material is next expanded by means of a scanning electron beam into a broad area of single crystal material. This single crystal may be patterned to form component sites. Multilayer structures are formed by covering each previous dielectric layer and component sites with a subsequent dielectric layer and repeating the process of single crystal growth using extensions of the hillocks as nucleation sites.

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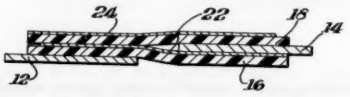
**3,789,277**
**WOUND CAPACITOR**

**Herbert C. Craig, Yankeetown, and Walter C. Lamphier, Maitland, both of Fla., assignors to Sprague Electric Company, North Adams, Mass.**

**Filed Jan. 29, 1973, Ser. No. 327,386**
**Int. Cl. H01g *1/14***
**U.S. Cl. 317—260** **5 Claims**

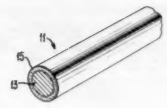


A wound capacitor employs extended electrodes of discrete foils each in contact with metallized surfaces of the dielectric layers.

**3,789,278**
**CORONA CHARGING DEVICE**

**Ronald E. Bingham; Thomas F. Cecil, both of Lexington, Ky.; Guido Galli, Saratoga, Calif., and Gereon E. Poquette, Versailles, Ky., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Dec. 20, 1972, Ser. No. 317,038**
**Int. Cl. H01j *1/14***
**U.S. Cl. 317—262 A** **14 Claims**



A negatively biased corona discharge system includes a conductive electrode having a thin inorganic dielectric outer layer bonded thereto which is employed as a corona discharge electrode. The discharge system is utilized for uniformly placing a negative charge on an insulator substrate such as an electrophotographic imaging surface. The coating on the electrode acts to suppress the widely spaced emission nodes common to all negatively biased metal corona discharge electrodes. The coated electrode may, therefore, be placed in close proximity to the substrate which it is charging and operated at low emission densities without sacrificing charge uniformity thereby reducing the power requirement of the corona discharge system.

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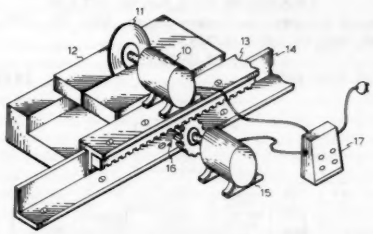
**3,789,279**
**WORK AND FEED CONTROL SYSTEM FOR CUTTING MACHINES**

**Edward Justing Dempsey, Huntington Beach; David Earl Kent, and Patrick William Hudspeth, both of La Mirada, all of Calif., assignors to Concrete Cutting Equipment, Incorporated, Hawthorne, Calif.**

**Filed July 21, 1972, Ser. No. 273,685**
**Int. Cl. G05b *19/24***
**U.S. Cl. 318—39** **9 Claims**



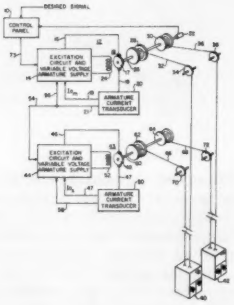
A control system for cutting machines is disclosed in which a desired load is maintained on the cutting motor by use of a servo system regulating power to a feed motor which produces relative motion between the cutting tool and the work. The input to the servo system is a load-level signal proportional to the load current to the cutting motor. That signal is derived by adding signals from current transformers on the power lines to the cutting motor. If the load-level signal exceeds a predetermined threshold, the feed motor is reversed and the servo system is forced to a full speed level. Once the overload condition is relieved, the feed motor is restored to forward drive, but the servo system is limited to a low level for a predetermined period to assure feeding into the work slowly.

3,789,280

## MULTICABLE DRUM HOISTING SYSTEM

Eric Oldfield, Burlington, Ontario, Canada, assignor to Westinghouse Canada Limited, Hamilton, Ontario, Canada

Filed Oct. 19, 1971, Ser. No. 190,613
Claims priority, application Canada, Nov. 12, 1970, 097899
Int. Cl. H02p 7/68
U.S. Cl. 318—45 11 Claims



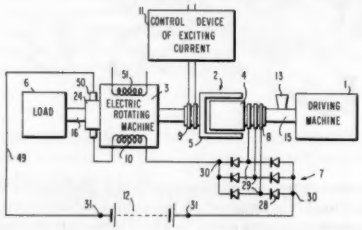
This invention relates to a multi-rope drum hoist wherein two conveyances are to be moved in opposite directions by the hoisting machinery at the same time. Each conveyance is hoisted by the use of two or more ropes, and the tension in the two ropes is equalized by providing a separate hoisting machine for each rope and coupling the hoisting machinery together electrically so that the torque outputs of the respective driving motors driving the separate hoists are essentially equal, thus assuring equal tension in the hoisting ropes.

3,789,281

## ELECTRIC CONTROL SYSTEM OF AN ELECTRIC MACHINE ARRANGEMENT COMBINING ELECTROMAGNETIC COUPLING WITH AN ELECTRIC ROTATING MACHINE

Fukuo Shibata, Hyogo, Japan, assignor to Kawasaki Jukogyo Kabushiki Kaisha, Hyogo, Japan

Filed May 30, 1972, Ser. No. 257,620
Claims priority, application Japan, May 28, 1971, 46-36746; Sept. 26, 1971, 46-74932
Int. Cl. H02k 17/24
U.S. Cl. 318—696 18 Claims



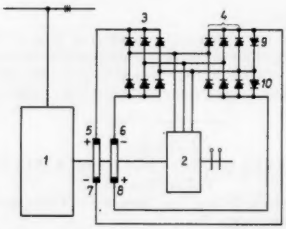

An electromagnetic coupling having two rotors is connected mechanically with an electric rotating machine, an armature winding of the electromagnetic coupling is connected electrically with an armature winding of the electric rotating machine through a converter, and an electric battery group is connected electrically in series with the armature winding of the electric rotating machine and D.C. terminals of the converter. The load of the above electric machine arrangement can be supplied with power properly from the electric battery group and a driving machine such as a prime mover which drives the above electric machine arrangement.

3,789,282

## ARRANGEMENT FOR PREVENTING CHATTERING AND SCORING OF DIRECT-CURRENT SLIP-RING BRUSHES

Hermann Harz, Berlin, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Sept. 7, 1972, Ser. No. 286,923
Claims priority, application Germany, Sept. 10, 1971, P 21 46 064.0
Int. Cl. H02k 13/10
U.S. Cl. 318—190 10 Claims



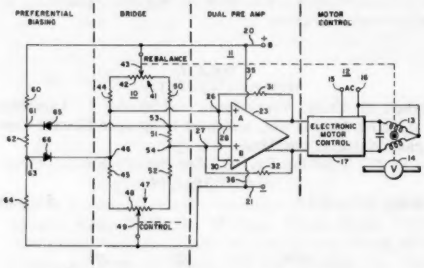
An arrangement is disclosed for preventing chattering and scoring of the slip-ring brushes of a synchronous machine during periods of time when the machine operates without load by supplying a supplementary direct-current to the brushes during these periods. The supplementary current does not flow through the winding of the machine which is connected to the brushes. The brushes are supplied from a source of alternating current through primary rectifiers connected in parallel with each other. A controllable additional rectifying circuit is arranged with respect to one of the rectifiers.

3,789,283

## CONDITION CONTROL REVERSIBLE MOTOR SYSTEM

John L. Kabat, Bloomington, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Feb. 20, 1973, Ser. No. 333,584
Int. Cl. G05b 1/06
U.S. Cl. 318—295 6 Claims




A condition control reversible motor system operates to rebalance a bridge circuit by means of a feedback potentiometer, the potentiometer wiper providing the energization potential to the bridge circuit. A reference voltage source and a lightly back-biased diode are connected to the bridge circuit in order to insure that the system always drives to a preferred

or safe end in the event that the feedback potentiometer wiper open-circuits from the potentiometer resistive element due to dirt or some other defect.

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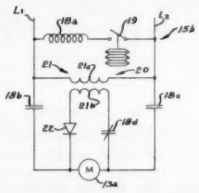
**3,789,284**
**AIR MOVING MEANS DRIVE SYSTEM**
**Robert F. Miller, Bowling Green, Ohio, assignor to Modine Manufacturing Company, Racine, Wis.**
**Filed July 6, 1972, Ser. No. 269,500**
**Int. Cl. H02p** *3/24*
**U.S. Cl. 318—377** **10 Claims**



An air moving means drive system wherein a plurality of air moving means, such as motor driven fans, is operated to move air in a preselected direction during concurrent operation thereof. One of the air moving means is cycled on and off and is susceptible in the "Off" condition to reverse rotation by the movement of air by the operating air moving means. Braking means are provided for limiting the reverse speed of the nonoperating air moving means. The air moving means may be driven by induction motors and the braking means may comprise dynamic braking means preventing reverse rotation of the nonoperating motor at a speed which would be sufficient to cause continued reverse movement upon an energization thereof which would normally be suitable to operate the motor in the preselected direction from standstill.

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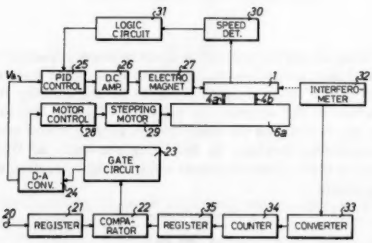
**3,789,285**
**POSITION CONTROL SYSTEM USING MAGNETIC FORCE**
**Junichi Nishizawa, Sendai, Japan, assignor to Handotai Kenkyu, Shinkokai, Miyagi-ken, Japan**
**Filed Mar. 27, 1972, Ser. No. 238,051**
**Int. Cl. G05b** *11/00*
**U.S. Cl. 318—687** **26 Claims**




The position control system using magnetic force, in which at least one pole of an electromagnet is opposed to a magnetic substance of a controlled object through an air gap therebetween so that a magnetic circuit including the magnetic substance, the air gap and the electromagnet is provided. The width of the air gap is preset to a value more than a predetermined width when the control current is zero. The controlled object is supported by at least one spring so as to be movable along a direction in which the magnetic force functions between the electromagnet and the magnetic substance. The control current of the electromagnet is controlled for adjusting the magnetic force and also a width of the air gap so as to obtain a desired position of the controlled object along the above mentioned direction. The magnetic flux density of the magnetic circuit substantially saturates at a condition where the air gap reaches a predetermined distance, while an elastic force of the spring is balanced with the magnetic force within the elastic region of the spring at the above-mentioned condition to avoid mutual collision between the controlled object and the electromagnet. The above mentioned principle can be modified for performing two or three dimensional control and rotation control for the controlled object.

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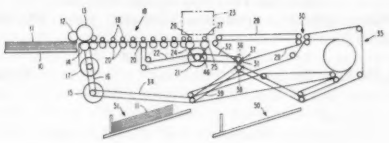
**3,789,286**
**SPEED CONTROL FOR STEPPER MOTORS BY TORQUE TRANSFER**
**Delbert D. Towne, and Michael N. Zell, both of Rochester, Minn., assignors to International Business Machines Corporation, Armonk, N.Y.**
**Filed Feb. 17, 1972, Ser. No. 227,069**
**Int. Cl. H02k** *37/00*
**U.S. Cl. 318—696** **13 Claims**



A document transport includes a stepping motor drive for incrementally advancing documents through a read station. The stepper motor drive ejects the documents from the read station to a continuously running stacker transport which conveys the document to one of two stackers. The stacker transport by means of a belt and pulley drives a gear which meshes with a gear coupled to the stepper motor drive by a one-way clutch whereby if the stepper motor drive tries to run faster than the continuously running drive it picks up the load of the stacker transport and is forced to run at the speed thereof. The stepper motor drive is free to stop or increment at any desired speed but it cannot exceed the speed of the stacker transport without picking up the load thereof. The emitter lead angle of the stepper motor drive is set so that the stepping motor would run faster than the stacker transport but the constraint of the stacker transport via the mechanical phase lock forces the stepper motor to run at stacker transport speed and excess torque of the stepper motor is transferred to the stacker transport. In stepper motor drive systems not having a continuously running transport section, the control load can take the form of a synchronous or induction A.C. motor driven at a predetermined speed, i.e., the regulated speed.

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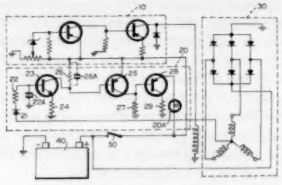
**3,789,287**
**VOLTAGE REGULATING DEVICE FOR VEHICLES**
**Te-Hsiung Wu, No. 68 Lin Chiang St., Taeipei, China /Taiwan**
**Filed May 19, 1972, Ser. No. 255,044**
**Int. Cl. H02j** *7/14*
**U.S. Cl. 320—48** **1 Claim**

Voltage regulating circuit for use in vehicles comprising a zener diode circuit which monitors the voltage of a battery

and when above a certain level stops energization of a field winding of a generator to thereby stop charging, and when



below a certain level causes one or more transistors to cause energization of the field winding and consequent charging of the battery.

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**3,789,288**

**CONVERTER FOR PRODUCING A STABILIZED OUTPUT DIRECT-CURRENT VOLTAGE FROM AN INPUT DIRECT-CURRENT VOLTAGE**

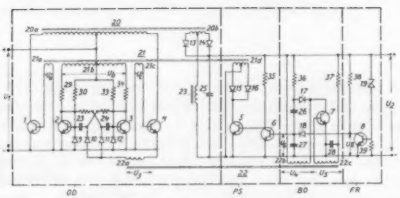
**Bengt Holger Assow, Ormingeringen 67, Saltsjo-Boo; Curt Evert Jansson, Lingragen 198, Farsta, and Kjell Ove Rolleberg, Spelvagen 5, Trangsund, all of Sweden**

**Filed Oct. 19, 1971, Ser. No. 190,597**

**Claims priority, application Sweden, Nov. 27, 1970, 16069/70**

**Int. Cl. H02m** *3/28*

**U.S. Cl. 321—2** **6 Claims**



The present disclosure relates to a converter for producing a stabilized output D.C. voltage from an input D.C. voltage. The stabilization of the output voltage is carried out by means of pulse width regulation of a rectangular wave voltage obtained from the chopped input voltage. The level of the output voltage is sensed by means of a sensing device and compared with a reference voltage, whereby an error signal is obtained. A blocking oscillator device is on one hand triggering a driving stage which controls the chopping of the input voltage, and is on the other hand delivering a saw tooth voltage in order to add the same to the error signal. The sum of said signals is fed to a pulse width control device for controlling said pulse width regulation.

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**3,789,289**

**VOLTAGE LEVEL CONTROL FOR D. C.-TO-D. C. CONVERTER**

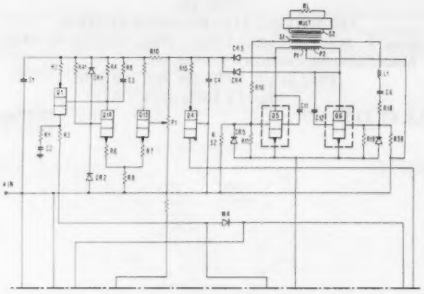
**David F. Bell, Woodstock; Girish C. Johari, Kingston, and Edward R. McNulty, Shokan, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Mar. 31, 1972, Ser. No. 240,083**

**Int. Cl. H02m** *3/32*

**U.S. Cl. 321—2** **4 Claims**

A D.C.-to-D.C. converter that employs a current switch chopper with the collectors of two switching transistors feeding opposite ends of a primary of a step up transformer. The transformer has a secondary which resonantly feeds back voltage to the bases of the two switching transistors for converting the voltage from D.C. to A.C. and includes floating compara-



tor means sensing the voltage at the collectors of these transistors to regulate the magnitude of the voltage by comparing that voltage with a reference voltage and then readjusting the current supplied to the floating emitters of the two switching transistors by a third transistor.

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**3,789,290**

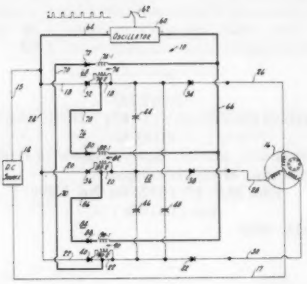
**VARIABLE SPEED MOTOR AND DRIVE CIRCUIT**

**Charles E. Rettig, Brookfield, Wis., assignor to The Louis Allis Company, Milwaukee, Wis.**

**Filed Dec. 13, 1971, Ser. No. 207,088**

**Int. Cl. H02m** *7/52;* **H02p** *1/26;* **H03k**

**U.S. Cl. 321—5** **7 Claims**



A firing circuit for use with a diode isolated, capacitor commutated inverter utilizes the operative state of the inverter for directing the firing or gating pulses to sequentially firable thyristors in the inverter. A plurality of pulse distribution paths are included in the firing circuit, each of which includes the preceding thyristor in the firing sequence so that the operative state of the thyristors controls the operation of the firing circuit.

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**3,789,291**

**VOLTAGE COMPENSATED PHASE SHIFTING CIRCUIT**

**Edward H. Dinger, Waynesboro, Va., and Richard A. Stasior, Liverpool, N.Y., assignors to General Electric Company, Salem, Va.**

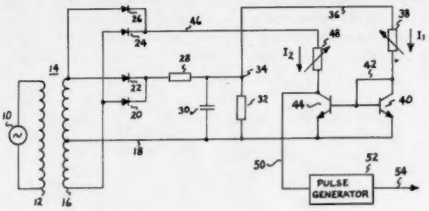
**Filed Mar. 6, 1973, Ser. No. 338,617**

**Int. Cl. G05f** *3/02;* **H03k** *5/20*

**U.S. Cl. 323—119** **10 Claims**

A voltage compensated phase shifting circuit is provided through the employment of a pair of matched transistors hav-

ing substantially identical electrical characteristics and to the bases of which there is applied a common voltage. The collector to emitter circuits of each of the transistors are supplied, respectively, with currents proportional to the average voltage




input and to the instantaneous voltage input. By the proper scaling of the two currents, an output signal representative of a desired phase displacement is obtained which output is substantially independent of instantaneous variations in the input voltage.

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**3,789,292**

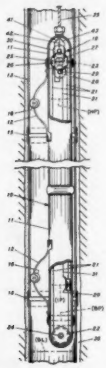
## METHOD OF ACCURATELY MEASURING, DEPTHWISE, WELL CASING COLLARS FOR INTERPRETATIVE PURPOSES

**Eugene R. Bottoms, Huntington Beach, Calif., assignor to Chevron Research Company, San Francisco, Calif.**

**Continuation of Ser. No. 863,064, Oct. 2, 1969, abandoned. This application Apr. 3, 1972, Ser. No. 240,408**

**Int. Cl. G01v** *1/40, 3/00*

**U.S. Cl. 324—34 R** **8 Claims**



Method and apparatus for accurately measuring differential distances along a cased well bore penetrating an earth formation by measuring, depthwise, the location of enlarged collars of the casings, using a sensor movably positioned within a mapping sonde traversing a well bore. The sensor is movably attached to the sonde through a transporting assembly; say, consisting of an endless belt driven between two sheaves, and controlled uphole by circuitry at the earth's surface, so as to indicate the location, depthwise, of at least two consecutively located collars of the casings, while the sonde is held stationary within the well bore. Through interpretation of the recorded results, differential movement of subterranean strata adjacent to the map casing can be inferred. Further, as unstable subterranean strata conditions are indicated, preventive measures, such as water flooding, can be undertaken prior to the occurrence of visual evidence, at the earth's surface, of the unstable conditions.

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**3,789,293**

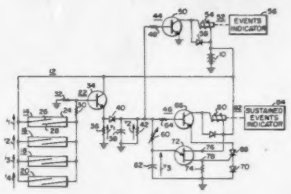
## ELECTRICAL CURRENT MONITOR WHICH SEPARATELY INDICATES INDIVIDUAL AND SUSTAINED CURRENT PULSES

**John A. Freeze, South Boston, Va., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed June 15, 1972, Ser. No. 263,053**

**Int. Cl. G01r** *31/02, 31/06, 19/16*

**U.S. Cl. 324—51** **13 Claims**




Transformer fault current monitor which provides recorded indications of the number of times any fault currents have occurred and also of the number of times fault currents which have a duration of more than a predetermined length of time have occurred. In one embodiment, a magnetic reed switch is positioned in the magnetic field produced by the monitored current. When the reed switch is closed by a high magnetic field, a voltage is applied to a peak detector circuit. The voltage is peak detected and applied to first and second counting means. The first counting means is activated when the monitored current exceeds a predetermined level. The second counting means is activated when the monitored current exceeds a predetermined level for a predetermined length of time. In another embodiment, magnetic diodes are positioned in the magnetic field produced by the monitored current. The magentic diodes are connected to a differential amplifier which provides an output voltage when a sufficient magnetic field surrounds the diodes. The differential amplifier is connected, through suitable circuitry, to first and second counting means.

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**3,789,294**

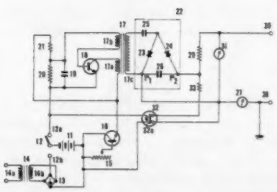
## APPARATUS FOR MEASURING INSULATING AND VOLTAGE RESISTANT CHARACTERISTICS OF ARTICLES

**Hifumi Nitta, Minokamo, and Mitsutaka Kaneko, Aichi-ken, both of Japan, assignors to Chubu Seiki Kabushiki Kaisha, Aichi-ken, Japan**

**Filed July 19, 1972, Ser. No. 273,265**

**Int. Cl. G01r** *31/12*

**U.S. Cl. 324—54** **3 Claims**



Device for measuring insulating and voltage resistant characteristics of articles such as a high voltage cable wherein a low battery voltage in converted into a high direct current

voltage with the aid of successive stages of oscillator, transformer and rectifier circuits whose output is applied across an article to be measured. The input bias of a transistor is changed in a manner such that the output of the circuits is made a given value whereby the insulating and voltage resistant characteristics of the article are measured by observing the indication of a voltmeter and ammeter.

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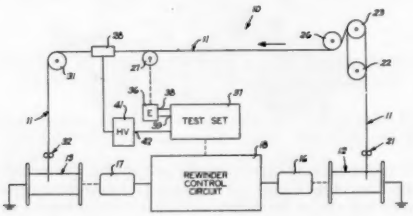
**3,789,295**

## METHODS OF AND APPARATUS FOR DETECTING, CLASSIFYING AND LOCATING INSULATION FAULTS IN INSULATED ELONGATED CONDUCTORS

**William Clement Balchunas, and Jose Antonio Mila, both of Atlanta, Ga., assignors to Western Electric Company, Incorporated, New York, N.Y.**

**Filed Apr. 2, 1973, Ser. No. 347,037**
**Int. Cl. G01r** *31/08, 31/12*
**U.S. Cl. 324—54** **15 Claims**




One or a twisted pair of grounded insulated wires are advanced longitudinally past a high voltage electrode maintained at a potential difference with respect to a wire sufficient to produce an arc discharge at a point on the wire containing an insulation fault. The arc discharge is translated to a logic level utilized to trigger a logic circuit discriminator which renders an output gated to identify the fault as a major or minor insulation fault, by comparing a preset number, representing a pulse count scaled to the length of the electrode traversed by the wire plus an arbitrarily determined amount related to the longitudinal extend of the fault, to the total number of pulses similarly scaled, representing the length of wire advanced past the electrode during the period of the arc discharge. If the length of wire advanced past the electrode during the arc discharge therein exceeds the preset length, the fault is identified as major, for example a bare wire or insulation split. Otherwise, the fault is identified as minor, for example, a pinhole. Electrical signals representing minor faults in excess of a predetermined permissible amount or a major fault may be utilized to indicate unacceptable insulated wire and, when utilized with a rewinder apparatus, may operate a control circuit therefor to slow down, stop and reverse the direction of the movement of the wire, and to trigger a fault location counter. The location counter counts up from zero until the direction of the wire is reversed, at which time it counts down to stop the reverse advance of the wire when the count again reaches zero, or a predetermined number, automatically to return the fault to the electrode or a predetermined distance therefrom where it can then be repaired or be removed from the wire.

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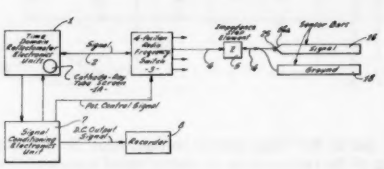
**3,789,296**

## MOISTURE MONITOR SYSTEM

**Philip J. Caruso, Jr., 15611 Dell Prado Dr., Hacienda Heights, Calif.; Lyle E. Rasmussen, Arcadia, and Joseph E. Scarbrough, Cypress, both of Calif., assignors to said Caruso, by said Rasmusen and Scarbrough**

**Filed June 12, 1972, Ser. No. 262,150**
**Int. Cl. G01r** *27/04*
**U.S. Cl. 324—58.5 B** **11 Claims**

A time domain reflectometer type of electronic instrument is provided which uses pulse reflectometry techniques for precisely monitoring the water content of a monitored product. The instrument may be used, for example, to monitor the quantity of liquid latex applied as an adhesive backing coating during the manufacture of carpeting. In such a case, the instrument assures a uniform backing of sufficient latex on the carpet to perform its intended function, but without wastage. The instrument, however, has other uses, such as for monitoring the water content in the production of paper, or in textile dying processes, or the like. In the practice of the invention, the product being monitored is passed as a continuous sheet through a pair of sensor bars, and the system of the invention measures the effective dielectric constant produced by the product as it passes between the bars. The sensor bars serve as a two-wire transmission line, and the system transmits narrow electric pulses down the transmission line and receives reflected pulses therefrom. The system uses radar principles, however, the signal is completely contained between the two sensor bars and the pulse returns are continuously received from successive points across the product. The size of the return is related to the amount of moisture content at each point along the product.



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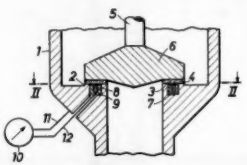
**3,789,297**

## LEAK DETECTOR

**Martin Frolich, Moosstrasse 2, Gumligen, Switzerland**

**Filed Oct. 4, 1971, Ser. No. 186,316**
**Int. Cl. G01r** *27/02*
**U.S. Cl. 324—65 R** **10 Claims**



A method of testing the fluid tightness of a sealed joint wherein a pair of electrodes are mounted adjacent the seal and are electrically insulated from each other. An indicator is connected to the electrodes which are constructed and arranged such that leakage of electrically conductive fluid through the seal will actuate the indicator.

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**3,789,298**

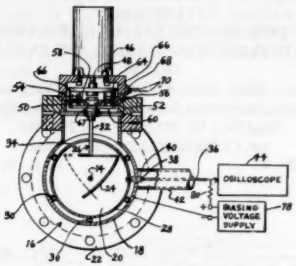
## BEAM SCANNER

**Raymond G. Herb, Madison, Wis., assignor to National Electrostatics Corp., Middleton, Wis.**

**Filed July 29, 1971, Ser. No. 167,253**
**Int. Cl. G01n** *27/00*; **G01r** *31/02*
**U.S. Cl. 324—71 EB** **23 Claims**

A beam scanning electrode is mounted on a rotor and is movable repeatedly across a beam of high energy particles

when the rotor is rotated. The scanning electrode is mounted within a beam tube having a conductive wall to which the scanning electrode is electrically connected, as by a wiping contactor. The impingement of the beam upon the scanning electrode causes the emission of secondary electrons which are gathered by a collector electrode, spaced from the scanning electrode and insulated from the conductive wall. An




output lead is connected to the collector electrode and is brought out of the tube by a feed-through insulator or the like. In a modified arrangement, the collector electrode comprises a material which scintillates or emits photons due to the impingement of the secondary electrons. The photons are then detected and measured by a photomultiplier or some other photoelectric device.

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**3,789,299**

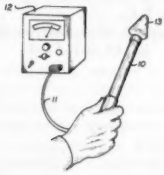
**PROBE FOR RADIATION DETECTOR**

**Edward E. Aslan, Plainview, N.Y., assignor to The Narda Microwave Corporation, Plainview, N.Y.**

**Division of Ser. No. 848,620, Aug. 8, 1969, Pat. No. 3,641,439. This application Nov. 5, 1971, Ser. No. 196,088**

**Int. Cl. H01q** *21/20*; **C01r** *5/22*

**U.S. Cl. 324—95** **13 Claims**



An elongated probe of materials having free space characteristics, supports, and antenna means at one end and conducting means aligned with its major axis for interconnection with an appropriate metering device.

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**3,789,300**

**DEMAND METER WITH SELF-ALIGNING BEARING ASSEMBLY**

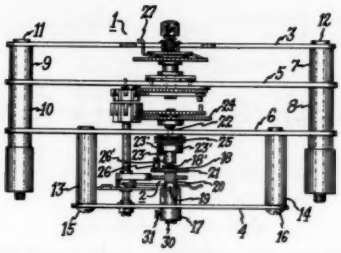
**Donald M. Ham, Rochester, N.H., assignor to General Electric Company, Pittsfield, Mass.**

**Filed Apr. 21, 1972, Ser. No. 246,458**

**Int. Cl. G01r** *19/16*

**U.S. Cl. 324—103 R** **1 Claim**

A self-aligning bearing assembly comprising a rigidly mounted bearing having a bushing sleeve pivotally mounted within a small-diameter orifice of a passageway through the bearing. The small-diameter orifice is formed by a thin lip portion of the bearing and the mounting arrangement between the bushing sleeve and the bearing comprises a plurality of fulcrum points about which the bushing sleeve is pivotal, within a limited range, thereby to enable it to be moved into axial alignment with a rotatable shaft member that is adapted to be inserted into the bushing sleeve. The other end of the rotatable shaft member is normally supported in a fixed position with respect to the rigidly mounted bearing by a supporting frame; accordingly, pivotal movement of the bushing sleeve affords a self-aligning capability between the end of the shaft that is fixed against radial movement and the rigidly supported bearing.



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**3,789,301**

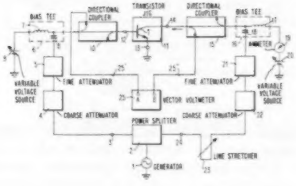
**METHOD AND APPARATUS FOR MEASURING THE PARAMETERS OF A TRANSISTOR OR OTHER TWO-PORT DEVICE AT MICROWAVE FREQUENCIES**

**Shashi Dhar Malaviya, Fishkill, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.**

**Filed Dec. 30, 1971, Ser. No. 214,132**

**Int. Cl. G01r** *31/26, 27/04*

**U.S. Cl. 324—158 T** **38 Claims**

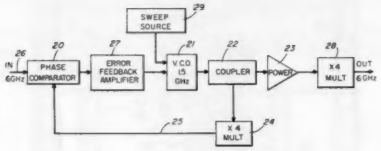



A first sinusoidal signal at a microwave frequency is applied to the input port of a transistor while simultaneously therewith a second sinusoidal signal at the same frequency is applied to the output port. The magnitude and phase of the signals are adjusted to effect successively short-circuit and open-circuit conditions at the input and output ports. For each condition the magnitudes and phases of the incident and reflected waves are measured or determined at the ports. These measurements may then be used to compute four of the usual transistor parameters and to check the self-consistency of the measurement. A second set of measurements may then be made at a different microwave frequency to compute additional transistor parameters. The beta of the transistor may be directly measured at either microwave frequency.

## 3,789,302
## FM HETERODYNE TRANSMITTER

**Richard H. Rearwin, Concord, and Fred P. Collins, Carlisle, both of Mass., assignors to Microwave Associates, Inc., Burlington, Mass.**

**Filed Mar. 31, 1972, Ser. No. 240,217**
**Int. Cl. H03c** *3/08*
**U.S. Cl. 325—146** **12 Claims**

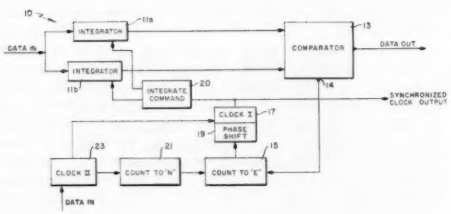



An FM heterodyne transmitter is disclosed useful, for example, in a microwave relay link, using all solid-state components throughout. The transmitter includes an RF amplifier which generates locally a signal having the same frequency as the signal carrier and a phase comparator which accepts both the local and the received signals and provides an error signal responsive to a phase difference between them. The error signal is used in a feedback amplifier loop to correct the local oscillator frequency in the direction which tends to negate the error signal.

## 3,789,303
## METHOD AND APPARATUS FOR SYNCHRONIZING SPLIT-PHASE PCM SIGNALS

**Eric J. Hoffman, and Jack C. Loessi, both of Ellicott City, Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed May 1, 1972, Ser. No. 248,822**
**Int. Cl. H04b** *1/16*
**U.S. Cl. 325—321** **4 Claims**

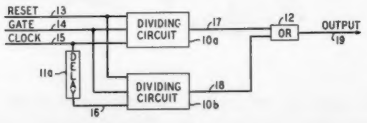



This is a device for resolving ambiguity of the start of a split-phase coded data bit. The device is initially synchronized with the zero crossings or polarity transition points in the coded data. A first integrator integrates the signal over one-half the data bit interval, and holds this value. A second integrator integrates the signal over the successive portion of the data bit interval and these two integrator signals are then compared. When the receiver clock is initially synchronized with a data bit polarity reversal, but not at the start of the data bit interval, the integrated signals will be of the same polarity and the comparator will so indicate this fact. To bring the receiver clock into synchronization with the start of the data bit interval, it is necessary to shift the clock output in time to be synchronized with the next successive polarity reversal or zero crossing. This is accomplished by a counting technique which resolves ambiguity introduced by attendant noise in the data transmission. A counter receives a predetermined number of minimum error signals within a given period of time. These error signals are signals out of the comparator indicating the same polarities for the integrated signals. As noise will sometimes cause this result when the clock is initially properly synchronized, reliability is increased by holding the initial synchronization until a minimum number of error signals are received, indicating the clock is not synchronized.

## 3,789,304
## GATED DIVIDING CIRCUIT WITH REDUCED TIME VARIATION BETWEEN GATING AND AN OUTPUT SIGNAL

**Paul Hillard May, Elon College, N.C., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Oct. 19, 1972, Ser. No. 299,056**
**Int. Cl. H03k** *5/156, 17/04, 21/00*
**U.S. Cl. 328—41** **12 Claims**

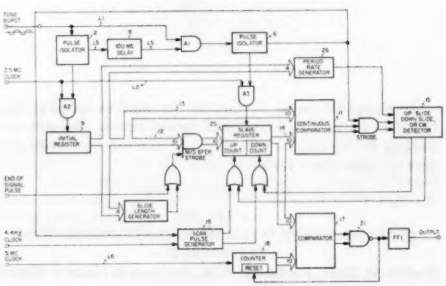



When the gating signal and clock pulses applied to a gated dividing circuit are unsynchronized, the first output produced by the circuit can appear any time within a time period equal to the intervals between the clock pulses. This time period is reduced, in accordance with the present disclosure, by using more than one such circuit, applying delayed versions of the clock input to the added circuits, and then combining the circuit outputs so that an output is produced whenever a predetermined number of the circuits produces a particular output.

## 3,789,305
## TONE BURST TO FREQUENCY CONVERTER

**Michael T. Marrero, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Aug. 28, 1972, Ser. No. 284,314**
**Int. Cl. H03d** *3/04*
**U.S. Cl. 328—140** **6 Claims**




Circuitry in a sonar simulator training device for detecting and reproducing the carrier frequency of a tone burst signal. The carrier is a sinusoid which may be frequency modulated with a linear FM signal (linear slide). The invention measures the frequency and period of the carrier frequency of an in-

coming tone burst signal, determines whether or not frequency modulation is present, and whether or not the FM results in an increase or decrease in carrier frequency (up slide or down slide). The invention generates a square wave output signal having the tone burst carrier frequency and provides means for generating an up slide or a down slide in the output signal.

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**3,789,306**

## APPARATUS FOR DEFINING CONTINUALLY THE ENVELOPE OF THE MAXIMA, THE MINIMA AND/OR MODULATION DEPTH OF A VARYING INPUT SIGNAL

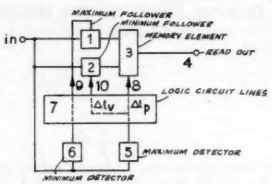
**Robert Hendrik Hammerschlag, Gezichtslaan 82, Bilthoven, Netherlands**

**Filed Sept. 18, 1972, Ser. No. 290,174**

**Claims priority, application Germany, Sept. 20, 1971, 2147532**

**Int. Cl. H03k** *5/00*

**U.S. Cl. 328—150** **17 Claims**




An apparatus for defining continually the envelope of the maxima of a varying input signal, consisting of: a maximum follower, which follows the input signal till a peak is reached and which holds this peak value, and a minimum detector, which gives a logic signal when the input signal has passed a minimum; the said logic signal of the minimum detector introducing the following three actions: firstly the peak value held by the maximum follower is given to a memory element, for example a sample-hold module, the value stored in this memory element being the read-out of the apparatus, secondly the said maximum follower is set back to a zero value and thirdly the maximum follower is released for following the varying input signal in order to measure the next maximum which will replace the previous maximum stored in the memory element when the next minimum is detected by the minimum detector.

The first and second action can be introduced by a maximum detector. Instead of the memory element one can use a second maximum follower in combination with a maximum selector. The envelope of the minima is defined by a similar apparatus. When an apparatus for defining the maxima is combined with an apparatus for defining the minima one gets an apparatus, which can define continually the modulation depth of a varying input signal.

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**3,789,307**

## FRAME SYNCHRONIZATION SYSTEM

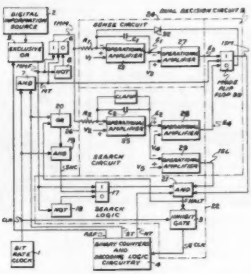
**James M. Clark, Cedar Grove, N.J., assignor to International Telephone and Telegraph Corporation, Nutley, N.J.**

**Continuation of Ser. No. 31,337, April 23, 1970, abandoned. This application Sept. 20, 1971, Ser. No. 182,120**

**Int. Cl. H03b** *3/04*

**U.S. Cl. 328—155** **5 Claims**

There is disclosed a framing control circuit for a frame synchronization system. The circuit includes a sense circuit having a first integrator with a relatively long time constant and a first amplitude comparator to detect an out-of-synchronization condition, and a search circuit having a second integrator with a relativeyly short time constant, a second amplitude comparator and a third amplitude comparator to detect an in-synchronization condition. The third amplitude comparator produces a high output and a mode flip flop having its "1" input coupled to the first comparator produces a high output on its "1" output when an out-of-synchronization condition is present. The simultaneous presence of these two signals activates the search logic of the frame synchronization system. The "0" input of the flip flop is coupled to the second comparator and produces a high output



on its "0" output when an in-synchronization condition is present. A diode is coupled between the "0" output of the flip flop and the input of the first integrator, said diode being rendered conductive when the "0" output is low. This diode conduction will reset the first ingegrator to a reference operating level which ensures full use of the time constant thereof and, hence, better protection against accidental phase shift (loss of synchronization) due to a short fade.

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**3,789,308**

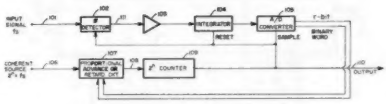
## DIGITAL PHASE LOCKED LOOP

**John R. Lowdenslager, Chappaqua, N.Y., assignor to The Singer Company, New York, N.Y.**

**Division of Ser. No. 94,263, Dec. 2, 1970, Pat. No. 3,729,674. This application Dec. 13, 1972, Ser. No. 314,607**

**Int. Cl. H03b** *3/04*

**U.S. Cl. 328—155** **4 Claims**



A digital phase locked loop is provided for an input signal at a frequency $f_s$. An n-stage counter is driven with a $2^n \times f_s$ coherent source. The input signal and the output of the $n$-stage counter are coupled to a phase detector which samples the phase of the input signal. The detected signal is periodically integrated. The integrated signal is coupled to an analog to digital converter whose output controls a pulse advance or retard means which is serially coupled between the coherent source and the counter.

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**3,789,309**

## DIGITAL COEFFICIENT ATTENUATOR

**Ronald W. Embley, Toms River, N.J., assignor to Electronic Associates Inc., Long Branch, N.J.**

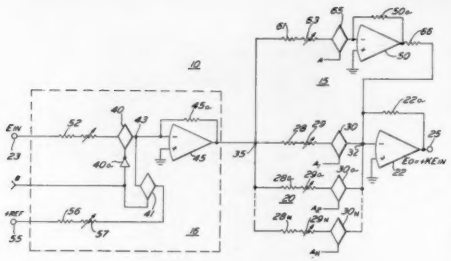
**Filed Mar. 7, 1973, Ser. No. 338,736**

**Int. Cl. H03k** *5/08*; **H03b** *3/02*

**U.S. Cl. 328—169** **11 Claims**

A digital coefficient attenuator having a first and a second amplifier with a ladder network connected between the first amplifier output and the second amplifier input and switcha-

ble in accordance with applied logic signals for providing attenuation at a selected coefficient value. A first analog gate connected between an input signal source and the first amplifier input and a second analog gate is connected between a reference potential source and the first amplifier input. The



gates are selectively operated so that with the first gate turned on there is produced at the second amplifier output an attenuated input signal in accordance with the selected coefficient value and with the second gate turned on there is produced at the second amplifier output a direct readout of the selected coefficient value.

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**3,789,310**

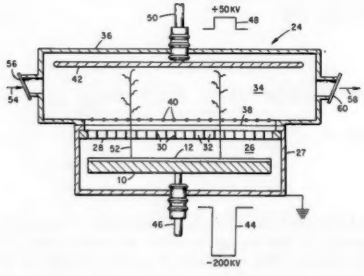
**HIGH-EMISSION COLD CATHODE**

**Lloyd Mancebo, Livermore, Calif., assignor to The United States of America as represented by the United States Atomic Energy Commission, Washington, D.C.**

**Filed Sept. 14, 1972, Ser. No. 289,030**

**Int. Cl. H01s** *3/02, 3/09*

**U.S. Cl. 330—4.3** **3 Claims**



A field-emission cathode having a multitude of field emission points for emitting a copious stream of electrons when subjected to a high field. The cathode is constructed by compressing a multitude of tungsten strips alternately arranged with molybdenum strips and copper ribbons or compressing alternately arranged copper plated tungsten and molybdenum strips, heating the arrangement to braze the tungsten and molybdenum strips together with the copper, machining and grinding the exposed strip edges of one side of the brazed arrangement to obtain a precisely planar surface, etching a portion of the molybdenum and copper to leave the edges of the tungsten strips protruding for electron emission, and subjecting the protruding edges of the tungsten strips to a high electric field to degas and roughen the surface to provide a large number of emitting points. The resulting structure is particularly useful as a cathode in a transversely excited gaseous laser where the cathode is mounted in a vacuum chamber for emitting electrons under the influence of a high electric field between the cathode and an extractor grid. The electrons pass through the extractor grid, a thin window in the wall of the laser chamber and into the laser chamber which is filled with a gaseous mixture of helium, nitrogen and carbon dioxide. A second grid is mounted on the gaseous side of the window. The electrons pass into the laser chamber under the influence of a second electric field between the second grid and an anode in the laser chamber to raise selected gas atoms of the gaseous mixture to appropriately excited states so that a subsequent coherent light beam passing through the mixture transversely to the electron stream through windows in opposite ends of the laser chamber stimulates the excited atoms to amplify the beam.

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**3,789,311**

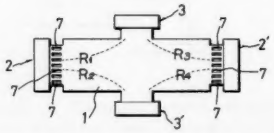
**HALL EFFECT DEVICE**

**Noboru Masuda, Kawaguchi, Japan, assignor to Denki Onkyo Co., Ltd., Tokyo, Japan**

**Filed Sept. 13, 1971, Ser. No. 180,029**

**Int. Cl. H03f** *15/00*

**U.S. Cl. 330—6** **8 Claims**



A Hall effect device provided with input terminal sections at both ends and output terminal sections, which are projected, at both sides of the center wherein at least one through hole is provided at a position near the side edge of at least one terminal section and is opened by cutting the side edge of the device so as to adjust unbalanced voltage.

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**3,789,312**

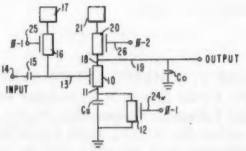
**THRESHOLD INDEPENDENT LINEAR AMPLIFIER**

**Lawrence G. Heller, Essex Junction, and Norbert G. Vogel, Jr., Colchester, both of Vt., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Apr. 3, 1972, Ser. No. 240,561**

**Int. Cl. H03f** *3/16*

**U.S. Cl. 330—35** **12 Claims**



Low level pulses in the order of 100 millivolts or less can be detected and amplified regardless of variations in the voltage required to turn on the active device used in the amplifier. This is achieved by coupling an active device between a capacitor and a capacitively loaded output line, charging the output line to a reference voltage, applying a level setting voltage to the device to turn on the device; charging the capacitor to a voltage substantially equivalent to the level setting voltage to turn off the device while maintaining it such that any input

signal superimposed on the level setting voltage will cause the device to again turn on and discharge the capacitively loaded output line thereby amplifying and inverting the superimposed input signal.

The invention is particularly useful for sensing random access integrated semiconductor memories.

The invention may be employed in either bipolar or field effect transistor technologies.

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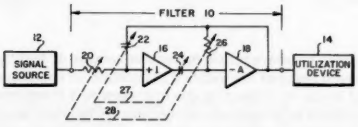
**3,789,313**

## ACTIVE FILTER CIRCUITS

**Albert E. Sanderson, Carlisle, Mass., assignor to Inventronics, Inc., Carlisle, Mass.**

**Filed May 23, 1972, Ser. No. 256,178**
**Int. Cl. H03f 1/36**
**U.S. Cl. 330—107** **14 Claims**




A family of active filter circuits. Each filter has two time constant networks with each network having an element in one loop of a multi-loop feedback circuit for an amplifier. A generalized transfer function

$e_o/e_{in} = as^2 + bs + c/(A+1)T1T2\ s^2 + [(A+1)T1 + T2]s + (A+1)$

describes the operation of each active filter. In this function, A is amplifier gain and T1 and T2 are time constants for the two time constant networks. Some specific circuits have a transfer function in which the coefficients "a" and "c" are 0 and operate as band-pass filters. In these circuits, amplifier gain variations do not affect the resonant frequency, while the resonant frequency can be changed by altering the time constant networks without affecting the quality factor or gain at resonance.

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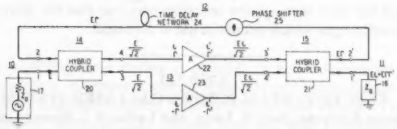
**3,789,314**

## AMPLIFIER UTILIZING INPUT SIGNAL POWER

**Henry Richard Beurrier, Chester Township, Morris County, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Dec. 6, 1971, Ser. No. 204,864**
**Int. Cl. H03f 1/00**
**U.S. Cl. 330—185** **11 Claims**



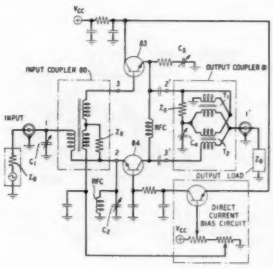

The power from a signal source used to drive an amplifier is usually dissipated in a matching impedance. In accordance with the present disclosure, this input power is conserved and added to the amplifier output power, thereby enhancing the power gain of the amplifier. This technique is particularly advantageous when used with devices having low intrinsic gain.

**3,789,315**

## HYBRID COUPLERS

**Henry Richard Beurrier, Chester Twp., Morris County, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Aug. 1, 1972, Ser. No. 276,912**
**Int. Cl. H03f 1/00**
**U.S. Cl. 330—185** **7 Claims**




Two, high frequency, broadband hybrid couplers are disclosed. The first comprises three identical coils wound on a common magnetic core. The second comprises two identical 1:1 turns ratio transformers. A coupler is realized by the particular manner in which the windings are connected.

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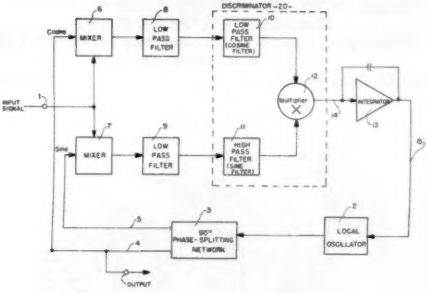
**3,789,316**

## SINE-COSINE FREQUENCY TRACKER

**Philip J. Goetz, Pleasantville, and Leon R. Solomon, Ossining, both of N.Y., assignors to The Singer Company, Little Falls, N.J.**

**Filed June 13, 1973, Ser. No. 369,749**
**Int. Cl. H03b 3/10**
**U.S. Cl. 331—12** **6 Claims**




A sine-cosine frequency tracking system is provided for tracking the center of power of a Doppler type input signal. The system of the invention includes a discriminator connected in an error feedback loop, and which develops an error signal whenever the center frequency of the input signal differs from the frequency of a pair of sine-cosine keying signals. The aforesaid discriminator incorporates solid state integrated circuitry, and it is constructed to eliminate the need for difficult trim adjustments which are necessary in the prior art systems. The aforesaid discriminator also serves to improve the accuracy of the system by removing error sources present in the prior art systems.

**3,789,317**

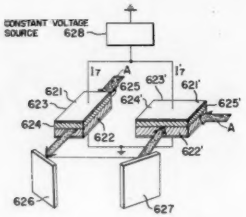
## SIGNAL CONVERTER WHEREIN PHOTOEMISSION TIME CONSTANT IS UTILIZED

**Junichi Nishizawa, Sendai, Japan, assignor to Zaiden Hojin Handotai Kenkyu Shinkokai, Miyagi-ken, Japan**

**Continuation-in-part of Ser. No. 683,920, Nov. 17, 1967. This application Sept. 27, 1971, Ser. No. 184,117**

**Int. Cl. H01s** *3/00*

**U.S. Cl. 331—94.5 C** **5 Claims**




A signal converter, wherein two semiconductor diodes are connected in the forward direction thereof as well as in parallel with a constant voltage source or a constant current source, and wherein a photoemission state of each of the semiconductor diodes is converted by an external light signal so as to perform the flip-flop signal conversion and pulse generation of the emitted light, the time constant of the signal conversion being from $10^{-10}$ to $10^{-12}$ second which is smaller by two to three places than the conventional flip-flop circuit utilizing electric signals.

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**3,789,318**

## STIMULATED EMISSION RADIATION SOURCE WITH ADJUSTABLE WAVELENGTH

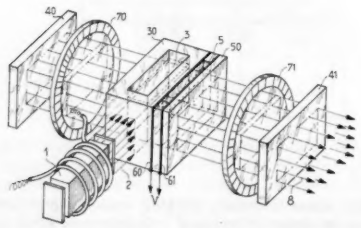
**Daniel B. Ostrowsky, and Erich Spitz, both of Paris, France, assignors to Thomson-CSF, Paris, France**

**Filed May 9, 1972, Ser. No. 251,692**

**Claims priority, application France, May 14, 1971, 7117557**

**Int. Cl. H01s** *3/00*

**U.S. Cl. 331—94.5 C** **3 Claims**




The invention relates to stimulated emission radiation source and more precisely to a dye laser in which the control of the emitted radiation wavelength is effected by varying the quality factor of the resonant cavity by means of a thin film of a nematic liquid crystal arranged between two polarisers, the double-refracting property of the film being controlled by a voltage applied through transparent electrodes.

**3,789,319**

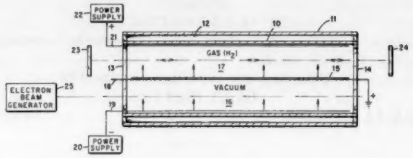
## HYDROGEN ROTATION-VIBRATION OSCILLATOR

**Charles K. Rhodes, Pleasanton, Calif., assignor to The United States of America as represented by the United States Atomic Energy Commission, Washington, D.C.**

**Filed May 8, 1972, Ser. No. 250,997**

**Int. Cl. H01s** *3/22, 3/09*

**U.S. Cl. 331—94.5** **8 Claims**




A laser system wherein molecular species of hydrogen and hydrogen isotopes are induced to oscillate on rotational-vibrational levels by subjecting the hydrogen to a transverse beam of electrons of a narrowly defined energy between about 1 and 5 eV, thereby producing high intensity and high energy output.

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**3,789,320**

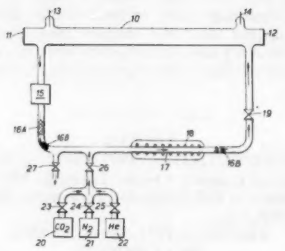
## GAS LASER CIRCULATION SYSTEM

**William Dunn Hepburn, Edinburgh, Scotland, assignor to Ferranti Limited, Hollinwood, Lancashire, England**

**Filed June 19, 1972, Ser. No. 263,948**

**Int. Cl. H01s** *3/02*

**U.S. Cl. 331—94.5** **5 Claims**




A gas circulation system for a laser comprises a reaction vessel comprising an empty tube which may be heated to an appropriate temperature, and means for circulating the gas from the laser through the reaction vessel so that the dissociation of the gas which occurs in use is reversed.

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**3,789,321**

## ELECTRON BEAM-PUMPED GAS LASER SYSTEM

**Barton Krawetz; Jack B. Long, and Leonard J. Mooney, all of Livermore, Calif., assignors to The United States of America as represented by the United States Atomic Energy Commission, Washington, D.C.**

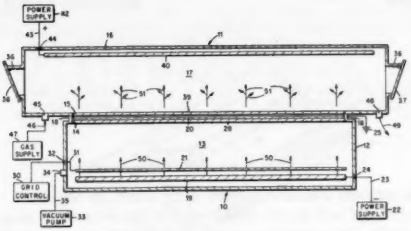
**Filed Sept. 14, 1972, Ser. No. 289,029**

**Int. Cl. H01s** *3/02*

**U.S. Cl. 331—94.5** **5 Claims**

An electron beam-initiated-and-sustained gas laser system capable of producing uniform, high energy, large-volume electrical discharges in a high-pressure gaseous lasing medium. A

thin metallic window separates the low pressure electron gun cavity from the longitudinally parallel high pressure gas cavity, such that the injected primary electrons create low energy secondary electrons which are swept across the gas cavity by an applied electric field collisionally exciting the gaseous




medium. The system is applicable in both the oscillator and amplifier configurations, and is capable, for example, of producing a 10 joule/liter of active volume short (tp ≈1 ns) $CO_2$ laser pulse, while being operable in a manned area due to the housing being electrically neutral.

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**3,789,322**

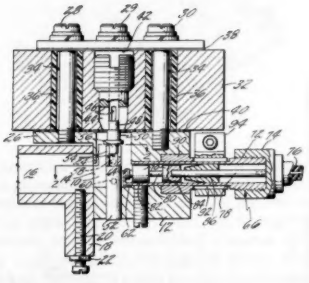
## MICROWAVE CAVITY TUNING LOOP INCLUDING A VARACTOR

**Allan L. Reynolds, White Plains, N.Y., assignor to United Aircraft Corporation, East Hartford, Conn.**

**Continuation of Ser. No. 156,726, June 25, 1971, abandoned. This application Nov. 24, 1972, Ser. No. 309,568**

**Int. Cl. H03b** *7/06*

**U.S. Cl. 331—96** **1 Claim**



A coupling loop having a varactor in series therewith extends into a microwave cavity, which in one embodiment includes a coaxially aligned transferred electron device (TED) oscillator, with aperture output coupling into a waveguide. Bias for the varactor is applied by coaxial waveguide circuitry, the outer conductor of which is integral with the coupling loop, the circuitry including a low pass filter and a microwave energy absorbing means. Means are provided to ensure that the cavity wall adjacent the varactor is a microwave short circuit. Ancillary structures includes a tellurium copper heat sink, including a collet type heat sink mount for the TED, invar tuning screws in the cavity and waveguide which are formed of aluminum walls, and other structural details.

**3,789,323**

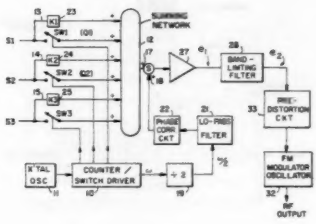
## MULTIPLE INPUT SIGNAL MODULATOR AND METHOD THEREFOR

**Robert A. Andersen, Los Altos Hills, and Lawrence A. Maguire, San Jose, both of Calif., assignors to Sigmatek, Inc., Cupertino, Calif.**

**Filed May 19, 1972, Ser. No. 255,139**

**Int. Cl. G01r** *23/16;* **H04j** *3/04*

**U.S. Cl. 332—18** **16 Claims**




A frequency modulator for either stereo or quadraphonic FM which in addition to summing the sampled audio inputs, also sums continuous fractions of the audio inputs to form the composite signal which modulates the carrier frequency. The fractions of audio inputs which are continuously coupled are adjusted to provide for optimum separation while allowing filter adjustment for optimum phase linearity. A predistortion network for the modulator-oscillator circuit maintains the high separation achieved by the foregoing adjustment.

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**3,789,324**

## LUMPED CONSTANT CIRCULATOR

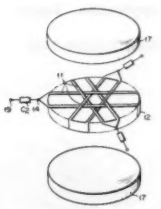
**Nobuo Iwase, Zushi, and Soji Okamura, Yokohama, both of Japan, assignors to Tokyo Shibaura Electric Co. Ltd., Kawasaki-shi, Japan**

**Filed June 1, 1972, Ser. No. 258,801**

**Claims priority, application Japan, June 18, 1971, 46-43316**

**Int. Cl. HO1p** *1/32*

**U.S. Cl. 333—1.1** **7 Claims**

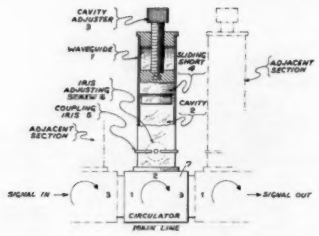


A lumped constant circulator comprising a conductor case; a central assembly consisting of a conductor assembly including at least three insulated conductor strips intersecting each other preferably at an angle of 120°, said conductor strips being each connected at one end to said conductor case and at the other end individually to a respective coaxial connector through a respective serially arranged capacitor; ferrite plates so superposed as to have said central conductor assemply sandwiched therebetween; and magnets for supplying said ferrite plates with a D.C. magnetic field acting perpendicular to their mutually facing surfaces.

## 3,789,325
## VARIABLE FREQUENCY AND COUPLING EQUALIZER AND METHOD FOR TUNING

Murray Hoffman, Livingston, N.J., assignor to International Telephone and Telegraph, Nutley, N.J.

Filed Nov. 24, 1971, Ser. No. 201,670
Int. Cl. H03h 7/16
U.S. Cl. 333—28 R 7 Claims

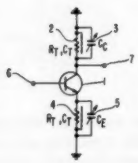



There is provided a variable equalizer adapted for operation in a communications system employing waveguide frequencies with a bandwidth of for example 500 MHz. The variable equalizer comprises a unique cavity arrangement in which substantially independent adjustments are provided for varying the cavity resonant frequency and the signal energy coupling thereto. The cavity is in turn coupled to the middle port of a three-port circulator which constitutes part of a transmission line for the signal energy. The arrangement is adaptable to have a plurality of circulators directly coupled together to form the transmission line, with each being provided with a separate one of the unique dual-adjustable cavity arrangements. In this way, equalization may be provided over extremely wide ranges of operating frequencies. A unique method is also disclosed for tuning such a variable equalizer to provide a substantially flat response across the entire intended operating band of frequencies.

## 3,789,326
## VARIABLE LINE EQUALIZER

Takuya Iwakami, Tokyo, Japan, assignor to Nippon Electric Company, Limited, Tokyo-to, Japan

Filed Dec. 7, 1972, Ser. No. 313,054
Claims priority, application Japan, Dec. 10, 1971, 46/100331
Int. Cl. H03h 5/00
U.S. Cl. 333—28 R 3 Claims

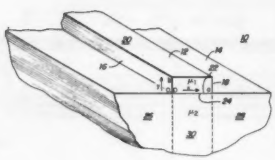



A variable line equalizer comprising a transistor, uniformly distributed RC networks, and variable capacitors provides compensation for coaxial line attenuation over a wide band of frequencies. The band width is determined by the values $R_T$, $C_T$, and $C_M$, where $R_T$ and $C_T$ are the total resistance and capacitance of the distributed networks, and $C_M$ is the maximum of the variable capacities.

## 3,789,327
## MICRO-ACOUSTIC WAVEGUIDE

Richard A. Waldron, Ipswich, England, and Ernest Stern, Concord, Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Filed May 24, 1972, Ser. No. 256,469
Int. Cl. H03h 7/30, 9/30
U.S. Cl. 333—30 R 17 Claims

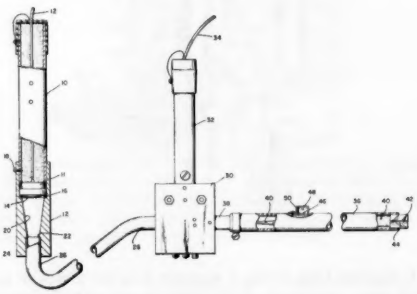


Apparatus is disclosed including a waveguide structure for controlling propagation of elastic waves including a rigid supporting substrate for suppressing propagation and an overlayer of elastic material for sustaining propagation and having a closed, defined, reflecting boundary surface for confining the elastic waves in the transverse dimensions.

## 3,789,328
## ACOUSTICAL DELAY LINE

Milton T. Putnam, Tarzana, Calif., and Duane H. Cooper, Champagne, Ill., assignors to United Recording Electronics Industries, North Hollywood, Calif.

Filed June 22, 1972, Ser. No. 265,388
Int. Cl. H03h 7/30
U.S. Cl. 333—30 12 Claims



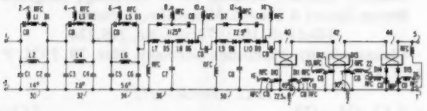
Apparatus for terminating the transmitting line of an acoustical delay line in a tunable cavity having the characteristic impedance of the transmitting line. The cavity is terminated and tunable over the acoustical frequency range by means of selectively located helmholtz resonators operating upon the direct waves and the reflected waves from the terminating device for providing the selectively located resonators to compensate the frequency spectrum for both peaks and dips at different frequencies.

3,789,329

## EIGHT BIT DIGITAL PHASE SHIFTER UTILIZING PLURALITY OF SWITCHABLE LOW PASS FILTERS

Gerald E. Johnson, Littleton, Colo., assignor to Martin Marietta Corporation, Washington, D.C.

Filed May 17, 1972, Ser. No. 254,262
Int. Cl. H01p 1/18
U.S. Cl. 333—31 R 9 Claims



An eight bit digital phase shifter includes a plurality of low pass filter networks to provide the lowest five bits. The first three bits are provided by low pass pi networks, phase shift being controlled by controlling the network series inductance. The next two bits are provided by low pass tee networks, phase shift being controlled by selectively shorting the network series inductance to effectively remove the filter from the phase shifter. The three highest bits are provided by 3dB hybrids.

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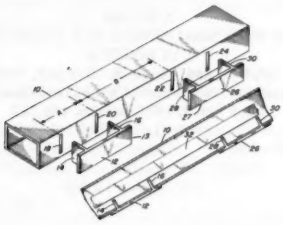
3,789,330

## FERRITE MICROWAVE PHASE SHIFTER WITH INSERTION PHASE MODIFYING MEANS

Earl Dixon, Voorhees Twp., and Norman Richard Landry, Willingboro, both of N.J., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Dec. 8, 1972, Ser. No. 313,229
Int. Cl. H01p 1/18
U.S. Cl. 333—31 A 12 Claims



An apparatus for modifying the insertion phase of a ferrite microwave phase shifter. A plurality of transverse metal plates are inserted into the waveguide to change the insertion phase. At least two plates are inserted into the waveguide through slots separated by a predetermined distance to keep the VSWR to a minimum. Each pair of plates introduces a predetermined amount of phase change. A sufficient number of pairs of plates are inserted to bring the insertion phase of the phase shifter within an allowable range of deviation from an ideal figure.

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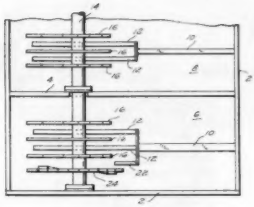
3,789,331

## VERNIER TUNING MEANS FOR UHF TUNER OR THE LIKE

Carroll R. Miner, Wilbraham, and Edward Balash, Chicopee, both of Mass., assignors to General Instrument Corporation, Newark, N.J.

Filed Sept. 29, 1972, Ser. No. 293,465
Int. Cl. H03j 3/20
U.S. Cl. 334—82 18 Claims

In a conventional variable capacitor type tuner, in which the rotor plates optionally may be provided with positionally adjustable sections which sequentially and cumulatively come into capacitive relationship with a stator plate of appreciable area, vernier tuning is accomplished by providing an additional stator plate of limited area which cooperates with its own rotor having individually positionable sections of substantially the same angular extent as the corresponding stator and which come sequentially and non-cumulatively into operative relationship with the stator. The individually positionable sections of the vernier rotor may be staggered with respect to the



individually positionable sections of the standard rotor for optimum results. The vernier rotor can generally be similar to the standard rotor in having its sections extend generally at right angles to the axis of rotation, in which case where many channels are to be tuned the individual sections of the vernier rotor may encompass the tuning of a limited plurality of said channels, or the sections of the vernier rotor may comprise extensions thereof extending generally parallel to the axis of rotation thereof, in which case a larger number of individual sections can be provided than with conventional rotors.

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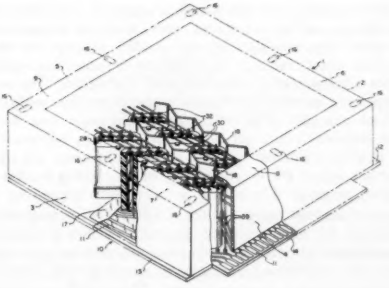
3,789,332

## IN-LINE REED CAPSULE CROSSPOINT MATRIX SWITCH

Khaja M. Jameel, Elmhurst, and Von W. Mueller, Lombard, both of Ill., assignors to GTE Automatic Electric Laboratories, Incorporated, Northlake, Ill.

Filed Feb. 20, 1973, Ser. No. 334,184
Int. Cl. H01h 67/30
U.S. Cl. 335—152 18 Claims



A modular in - line crosspoint matrix switch having reed capsule assemblies each having reed capsules mounted in a bobbin, electromagnetic winding on each bobbin, the reed capsules and windings being wired to form the crosspoint matrix and further having zig-zag shield means arranged between adjacent rows of the bobbins.

3,789,333

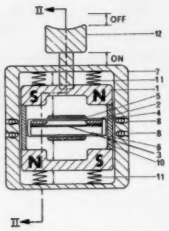
## MAGNETO-MOTIVE BISTABLE SWITCHING DEVICES

Waldemar Helmut Kurpanek, Mercator Str. 3, Duesseldorf, Germany

Continuation-in-part of Ser. No. 273,940, July 21, 1972, and a continuation-in-part of Ser. Nos. 149,174, June 2, 1971, abandoned, and Ser. No. 273,941, July 21, 1972, which is a continuation-in-part of Ser. No. 149,174, June 2, 1971, and Ser. No. 273,940, July 21, 1972. This application Sept. 27, 1972, Ser. No. 273,942

Int. Cl. H01h 51/28, 53/06, 36/00

U.S. Cl. 335—207 12 Claims




A magneto-motive bistable switch comprising a hermetically sealed contact container having at least one pair of electrical contact points and a free floating ferro-magnetic contactor. An electro-magnetic coil encircles the contact container which is placed within the magnetic flux of two spring loaded permanent magnets. The switch is electrically tripped by a dc trigger pulse thus energizing the coil to thereby magnetically polarize the ferro-magnetic contactor which is thereupon magnetically attracted towards one permanent magnet respectively thus establishing a bridging relationship with at least one pair of electrical contact points. The switch is manually operated by exterior pressure on a switch knob which changes the distance between permanent magnet and contactor which is thereupon attracted to the respective closer permanent magnet thus executing the switching operation. The switch may function as an ac overload circuit breaker when a contactor with a preestablished curie point is used to indicate a sudden power surge. By attaining the curie temperature it loses its ferro-magnetic qualities and thereupon falls off the contact points due to the force of gravitational attraction and breaks the circuit.

The inventive idea postulates a manually and electrically operable ac and dc switch and overload circuit breaker which functions directionally fully independent (except for the ac overload circuit breaker) is absolutely fireproof and operates within a temperature range of 1,000° Centigrade. The switch comprises a hermetically sealed contact container embodying at least one pair of electrical contact points a free floating ferro-magnetic contactor. An electro-magnetic coil encircling the contact container and the contact container are placed together within the magnetic flux of two spring loaded permanent magnets. The switch is electrically tripped by a dc trigger pulse thus energizing the coil that thereby magnetically polarizes the ferro-magnetic contactor which is thereupon magnetically attracted towards one permanent magnet respectively thus establishing a bridging relationship with at least one pair of electrical contact points. The switch is manually operated by exterior pressure on a switch knob thus changing the distance between permanent magnet and contactor which is thereupon attracted to the respective closer permanent magnet thus executing the switching operation. As an ac overload circuit breaker a contactor with preestablished curie point is applied to indicate a sudden power surge by attaining curie temperature thus losing the ferro-magnetic qualities thereupon falling off the contact points due to the force of gravitational attraction thereby breaking circuit. Resetting is either manually or electrically accomplished.

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3,789,334

## ELECTRIC PROTECTIVE SWITCH FOR PROTECTION AGAINST FAULT CURRENTS, EXCESS CURRENTS AND SHORT CIRCUITS

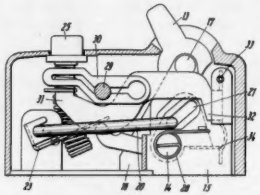
Rolf Goehle, Leimen; Walter Velten, Schwetzingen, and Gunther Knirsch, Bretten, all of Germany, assignors to Brown, Boveri & Cie AG, Mannheim, Germany

Filed Feb. 10, 1972, Ser. No. 225,226

Claims priority, application Germany, Mar. 29, 1971, P 21 15 034.5

Int. Cl. H01h 71/12

U.S. Cl. 335—173 3 Claims



The switch comprises an automatic cutout on circuit breaker and a separate fault current responsive part with a suitable cutout actuating element. A disengaging clutch is provided and permits closing of the automatic cutout only in the ready position of the fault current release.

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3,789,335

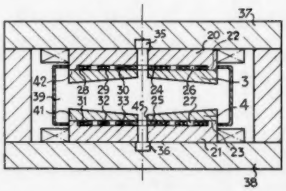
## MAGNETIC FOCUSING DEVICE FOR AN ISOCHRONOUS CYCLOTRON

Pierre P. Delphin, and Pierre R. Peironet, both of Paris, France, assignors to Thomson-CSF, Paris, France

Filed Oct. 4, 1971, Ser. No. 186,202

Int. Cl. H01t 7/00

U.S. Cl. 335—210 9 Claims



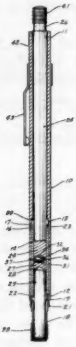

This device makes it possible to secure a major improvement in the efficiency of particle accelerators of the isochronous cyclotron type. It comprises a soft magnetic yoke, two circular soft-iron plates protuding from said yoke, first and second sets of soft magnetic sectors facing each other and building up the main airgap of the device, these sectors being respectively carried by two plates, two annular spacings being respectively provided between the sectors and their carrying plate, and correcting magnetic means being positioned within said annular spacings.

3,789,336

## RETRACTIBLE MAGNET HOLDER

Myron K. Gordin, Oskaloosa, Iowa, assignor to G & L Industries, Inc., Oskaloosa, Iowa

Filed Feb. 22, 1973, Ser. No. 334,853
Int. Cl. H01f 7/20
U.S. Cl. 335—285 2 Claims



A retractible magnet holder including a barrel member with an elongated cap member extended outwardly from one end, and a sleeve member fixed in the barrel member adjacent such one end. The barrel member and end cap are composed of a non-magnetic material, and the sleeve member is formed of a magnetic material. A non-magnetic shaft member and an attached magnet are reciprocally movable within the barrel member to a first metal pick-up position wherein the magnet is within the cap member and to a second metal release position wherein the magnet is within the sleeve member. A latch means stops and releasably holds the shaft member and magnet in the second position therefor.

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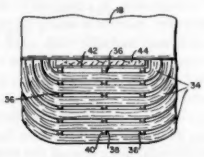
3,789,337

## INSULATION STRUCTURE FOR ELECTRICAL APPARATUS

Harry R. Sheppard, Sharon, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Dec. 17, 1971, Ser. No. 209,466
Int. Cl. H01f 27/08
U.S. Cl. 336—60 18 Claims



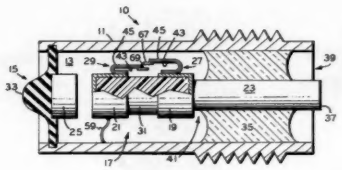
Insulation structure having filler members which keep the overall insulation structure tight when heated. The filler members are located within the insulation structure at various places and in sufficient quantities, with the shortest dimension of the filler member oriented in the direction in which expansion is desired. As the insulation structure is heated, the shortest dimension of the filler member increases to tighten the insulation structure. The filler member is constructed from a material which tends to reduce its surface area when heated without changing its volume.

3,789,338

## PRESSURE SENSOR DEVICE

Nikolaus A. Szeverenyi, and David F. Thompson, both of Warren, Pa., assignors to GTE Sylvania Incorporated, Seneca Falls, N.Y.

Filed Oct. 2, 1972, Ser. No. 294,457
Int. Cl. H01h 37/00
U.S. Cl. 337—3 20 Claims



A sensor device senses the presence or absence of pressure. As the pressure about the device exceeds a pre-established level, a movable tip of the device is depressed. A thermally conductive portion of the tip thereby engages a spaced apart portion of an element. This engagement upsets the thermal properties within the device, causing two heat responsive members to disengage. A sensing apparatus is also disclosed which includes the above described device and an electrical circuit which comprises a potential source and a current indicating means. When the above mentioned heat responsive members are engaged, current in the circuit is at a sufficient level to activate the current indicating means. However, when the heat responsive members disengage, the current must pass through a resistive material, thereby lowering the level of current flow. This lower electrical current is then not sufficient to actuate the indicating means.

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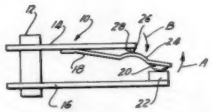
3,789,339

## THERMOSTATIC SWITCH

Glenn E. Wehl, North Canton, Ohio, assignor to Portage Electric Products, Inc., North Canton, Ohio

Filed Apr. 16, 1973, Ser. No. 351,162
Int. Cl. H01h 61/00
U.S. Cl. 337—95 5 Claims



A thermostatic switch having a bimetallic electric-contact-carrying blade with a dish-shaped snap portion is provided. "-Creep" opening of the contacts prior to snap-open action is substantially eliminated by forming the terminal arm that carries the bimetallic blade and the fulcrum for the dish-shaped portion of a bimetal positioned to deflect in response to temperature change in a direction opposite to the direction in which the bimetallic blade deflects.

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## ERRATUM

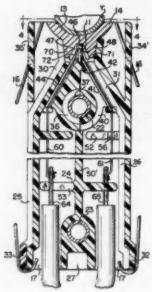
For Class 338—24 see:
Patent No. 3,789,191

3,789,340

## THERMAL SENSING DEVICE FOR CONTROL CIRCUITS

Jay C. Adams, Columbus, Ohio, assignor to Ranco Incorporated, Columbus, Ohio

Filed July 17, 1972, Ser. No. 272,316
Int. Cl. H01c 7/00
U.S. Cl. 338—28 11 Claims



A thermal sensor for application to the exterior of a tube or the like comprises a thermistor supported within a rectangular casing, one end of which is urged by a spring into engagement with the tube. The portion of the casing engaging the tube comprises a heat transfer member having a surface contoured to extensively engage a portion of the tube and having a pair of legs extending inwardly of the casing and straddling the thermistor which is held in a cage-like structure in the interior of the casing. A thermal conducting cement fills voids between the thermistor and the heat transfer member.

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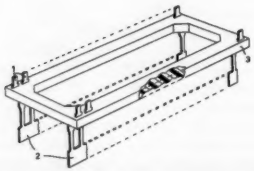
3,789,341

## CIRCUIT PACKAGE

Claudio Dalmasso, Ivrea, Italy, assignor to Ing. C. Olivetti & C. S.p.A., Ivrea (Torino), Italy

Filed Jan. 20, 1972, Ser. No. 219,419
Claims priority, application Italy, Jan. 29, 1971, 67296/71
Int. Cl. H05k 1/00
U.S. Cl. 339—17 CF 2 Claims



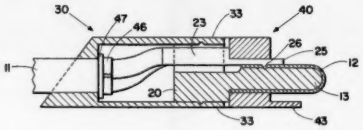
Disclosed is a circuit package which utilizes a collar member made of injected polysulphone plastic to support an integrated circuit board. The plastic collar has imbedded therein a plurality of terminal leads. The collar and terminal lead arrangement is constructed before the integrated circuit board is attached, thereby allowing the high temperature and pressure injection process to be used to form the support collar. Any plastic which is heavily charged with glass or alumina can be used.

3,789,342

## ELECTRICAL CONNECTOR

Peter Francis Maheux, Kanata, Ontario, Canada, assignor to Bell-Northern Research Ltd., Ottawa, Ontario, Canada

Filed Jan. 26, 1973, Ser. No. 327,090
Int. Cl. H05k 1/04
U.S. Cl. 339—17 F 8 Claims



A connector for connecting wire conductors to a flexible circuit. The flexible circuit is formed over one member of connector and the wires each have a terminal attached thereto, the terminals positioned in recesses in a second member of connector. Retaining means hold the flexible circuit and the terminals in position. The two connector members clip together to make electrical contact between terminals and flexible circuit. The connector can be arranged to cooperate with formations on a housing to lock two parts of a housing together.

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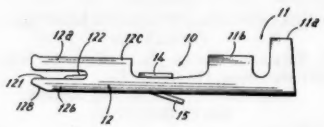
3,789,343

## ELECTRICAL CONNECTOR

Kazuaki Hirokawa, Tokyo, and Tsugio Anbo, Tokorozawa, both of Japan, assignors to Shinagawa Automotive Electric Wire Co., Ltd., Tokyo-to, Japan

Filed June 2, 1972, Ser. No. 259,192
Claims priority, application Japan, June 4, 1971, 46-46205; Feb. 17, 1972, 47-20142; Mar. 22, 1972, 47-34401
Int. Cl. H01r 25/00
U.S. Cl. 339—49 R 18 Claims



An electrical connector is composed of a pair of hermaphroditic connector members being of the identical structure and dimension and matable with each other. Each hermaphroditic connector member comprises a wire connecting portion at one end region, a fixing portion at a middle region and a mating portion at the other end region. The mating portion is of a tubular-like configuration, preferably of an ellipse-like configuration in section, and has two facing slots each of which extends in an axial direction of the mating portion from a tip end of said tubular-like mating portion to an approximately middle position of the mating portion. The tip portion of the tubular-like mating portion is divided by the slots into two semitubular-like portions. On an inner surface of one of the semitubular-like portion, an inwardly inclined spring tongue is provided. The structure and dimensions of the facing slots, the semitubular-like portion of the mating portion and the spring tongue are respectively predetermined to make the outer surface of the semitubular-like portion which is provided with the spring tongue closely contact the inner surface of another connector member's semitubular-like portion having no spring tongue when the mating portions of both hermaphroditic connector means are mutually inserted. The her-

maphroditic connector means are housed in a casing and fixed thereto through the abovementioned fixing portions of the connector means.

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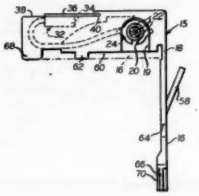
3,789,344

## ELECTRICAL CONNECTOR FOR TELEPHONE CORDS

William J. Brorein, Whippany, and Nicholas Humen, Bayonne, both of N.J., assignors to General Cable Corporation, New York, N.Y.

Filed Nov. 12, 1971, Ser. No. 198,323
Int. Cl. H01r *13/54, 13/58, 13/40*
U.S. Cl. 339—59 M 20 Claims



This electrical connector has a housing and a cover hinged together. Conductors and terminals on the conductors are assembled in the housing, and the cover is then swung into closed position where it has a snap lock for holding it closed. The housing has different cavities for receiving each terminal and the upper ends of the cavities are constructed so as to distort as the terminals are inserted and then spring back to hold the terminals and their connected conductors in place. This connector cannot only be assembled in much less time than prior connectors, but in the event of an error in the relation of the terminals, the error can be easily corrected; and repairs are also facilitated since the connector can be reopened without removal of any rivets or other fastenings.

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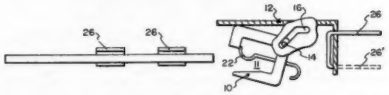
3,789,345

## LOW INSERTION/EXTRACTION FORCE PRINTED WIRING BOARD CONNECTOR

William A. Reimer, Wheaton, and Peter K. Gerlach, Oak Park, both of Ill., assignors to GTE Automatic Electric Corporation Laboratories Incorporated, Northlake, Ill.

Filed Oct. 2, 1972, Ser. No. 293,971
Int. Cl. H01r *13/62*
U.S. Cl. 339—75 MP 6 Claims



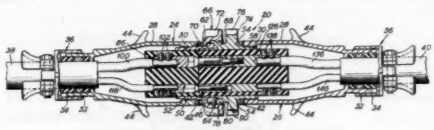
A printed wiring board connector is provided with a plurality of spring contacts and is mounted in a bracket such that it is rotatable about a longitudinal axis. The insertion of a printed wiring board operates to rotate the connector whereby the spring contacts engage the circuits of the board. The forces necessary to insert and extract the board are thereby substantially reduced.

3,789,346

## ELECTRICAL COUPLING WITH PRESSURE CONTACTS AND MULTIPLE CONDUCTANCE PATHS

Eric De Brick, Bluefield, W. Va., assignor to West Virginia Armature Company, Bluefield, W. Va.

Filed Sept. 5, 1972, Ser. No. 286,012
Int. Cl. H01r *13/54*
U.S. Cl. 339—89 R 6 Claims



Electrical coupling includes a plug and receptacle. The plug has multiple pin contacts engageable within socket contacts in the receptacle. The pin contacts are split expandable tubes telescopically engageable within bores in the socket contacts which are non-expandable. Auxiliary pressure and contact means includes tapered plugs within the socket contacts, pressed outwardly by springs to engage tapered bores in the tubular pin contacts to expand the latter into substantial electrically conductive engagement with the bores of the socket contacts. Two conductive paths are thereby created between each corresponding pin contact and socket contact. One conductive path is established through the outer surface of the pin contact and the bore of the socket contact, and another conductive path is established through the bore of the pin contact and the tapered plug.

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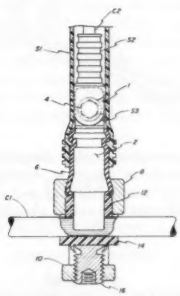
3,789,347

## INSULATION PIERCING CONNECTOR FOR UNDERGROUND INSTALLATION

James Joseph Cooper, Jr., St. Louis, Mo., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Feb. 2, 1972, Ser. No. 222,917
Int. Cl. H01r *9/08, 11/20*
U.S. Cl. 339—97 R 11 Claims

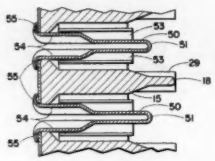


An insulated connector is provided for use in making tap connections to insulated power lines. The connector incorporates an insulation and wire piercing element for establishing electrical connections between a main power line and a tap line. It includes elements which stop the piercing element from cutting beyond a preselected depth.

### 3,789,348
### TERMINAL BLOCK

**George Victor Lenaerts; Graham Sterling Laing; Ronald Joseph Morrell, and Wesley Nelson Willis, all of London, Ontario, Canada, assignors to Northern Electric Company Limited, Montreal, Quebec, by said Lenaerts, Morrell and Willis and Bell Northern Research Ltd., Ottawa, Ontario, both of, Canada, by said Laing**

**Filed Apr. 9, 1973, Ser. No. 349,320**
**Int. Cl. H01r** *9/00*
**U.S. Cl. 339—198 R** **4 Claims**

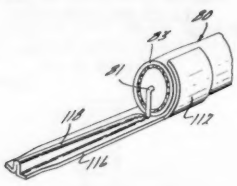



A terminal block, particularly for use in confined spaces such as telephone units, having a plurality of rectangular recesses arranged in rows and columns, the rows extending in the direction of the longitudinal axes of the recesses. An upwardly projecting rib extends between each pair of adjacent rows, each rib having a cross-section which assists in entering a connector into a terminal in a recess. Terminals are held in position by portions extending through holes in the base of the block and rivetted over. The holes have chamfered edges to assist in initial assembly of terminals. The ribs act as separations between rows to prevent contact between adjacent rows of connections -permitting a high density of connections.

### 3,789,349
### DISTRIBUTOR CAP ELECTRODE AND CABLE TERMINATION

**Ian J. C. Scott, Madison Heights, Mich., assignor to Chrysler Corporation, Highland Park, Mich.**

**Filed Jan. 10, 1973, Ser. No. 322,576**
**Int. Cl. H01r** *15/12*
**U.S. Cl. 339—223 S** **5 Claims**



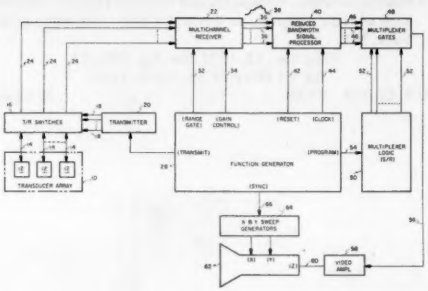

An internal combustion engine distributor cap has a high tension output electrode which is readily insertable in and removable from the distributor cap and serves also as a dependable electrical termination for an ignition spark plug cable.

### 3,789,350
### REDUCED BANDWIDTH PROCESSING FOR ULTRASONIC IMAGE CONVERSION

**Albert L. Rolle, Lynn Haven, Fla., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Oct. 13, 1972, Ser. No. 297,574**
**Int. Cl. G01s** *9/66*
**U.S. Cl. 340—3 R** **8 Claims**

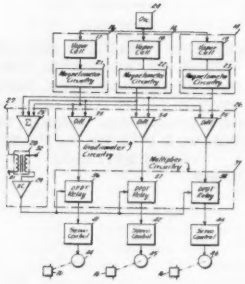
Disclosed is an ultrasonic, image conversion, high definition sonar having a multitude of transducer channels employing improved signal processing in each channel to reduce video bandwidth and switching speed requirements. Signal processing is characterized in each of the multitude of channels by detecting and holding the peak return from a transmit pulse for the remainder of the pulse project period, then holding that peak value for the subsequent pulse project period, during which time the value may be multiplexed for conversion to video signals for a CRT display, or may be applied to elements of an LED array.




### 3,789,351
### GUIDANCE SYSTEM

**David W. Feldman, and James C. Slone, Jr., both of Panama City, Fla., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Sept. 4, 1970, Ser. No. 78,341**
**Int. Cl. G01r** *33/02*; **G01c** *19/30*
**U.S. Cl. 340—4 R** **8 Claims**

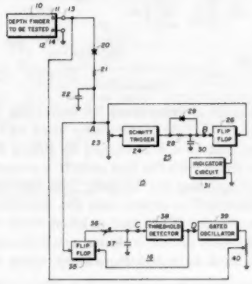


A guidance system is disclosed which employs three total field magnetometer sensors located in a plane and spaced equiangularly about the axis of locomotion. Circuitry is disclosed to combine the outputs of adjacent sensors for operation of a control element positioned at right angles to the plane of the sensors, so as to steer a desired course with respect to a magnetic anomaly in an ambient, i.e., the earth's, magnetic field. Circuitry is also disclosed which is effective to resolve the ambiguity of steering toward or away from the anomaly and, thereby, insure the desired course of steerage.

## 3,789,352
## METHOD AND APPARATUS FOR TESTING DEPTH FINDERS

**Eric B. Forsyth, Brookhaven, N.Y., assignor to Ensign Electronics, Inc., Brookhaven, N.Y.**

**Filed May 25, 1972, Ser. No. 256,789**
**Int. Cl. H04b** *1/00*
**U.S. Cl. 340—5 C** **8 Claims**

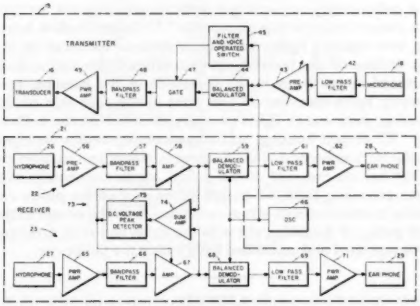



Depth finders are tested and calibrated on the bench without the respective transducer, by generating a delayed pulse responsive to the depth finder's transmitted pulse, the delayed pulse being applied to the depth finder to simulate an echo pulse. Preferably, the echo pulse is in the form of spikes to shock excite the depth finder. A circuit is also provided to indicate the amplitude and width of the transmitted pulse of the depth finder.

## 3,789,353
## DIVER COMMUNICATION SYSTEM

**Earl Kent Hunter, Gig Harbor, Wash., and Don G. Smith, Shalimar, Fla., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Jan. 3, 1973, Ser. No. 320,781**
**Int. Cl. G01s** *3/80*
**U.S. Cl. 340—5 T** **16 Claims**

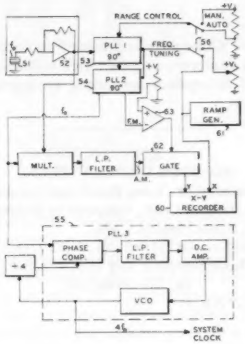



An underwater diver communication system is disclosed as including a voice actuated transmitter for broadcasting speech signals throughout an ambient subaqueous environmental medium combined with a two-channel, binaural, speech signal receiver by means of a common local oscillator connected therebetween which, in turn, effects relative phase enhancement in the channels thereof. In addition, the two channels of said binaural receiver incorporate substantially identical adjustable gain amplifiers, respectively, the gains of which are identically regulated by a single control signal from a unique feedback type of signal amplitude enhancement circuit that is effective to further distinguish the amplitudes of the speech signals being processed within one receiver channel relative to those being processed within the other receiver channel, to thereby facilitate the localization of the speech signals received by said diver from said ambient subaqueous environmental medium.

## 3,789,354
## PASSIVE HOLOGRAPHY SYSTEM

**Ronald Frederick Sternberg; Roger Fred Koppelmann, both of Livonia, and Rolf K. Mill, Brighton, all of Mich., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Nov. 21, 1972, Ser. No. 308,387**
**Int. Cl. H04b** *1/00*
**U.S. Cl. 340—5 H** **6 Claims**




The disclosure deals with a passive holography system for imaging remotely generated coherent acoustical signal source thru the techniques of phase locking a locally controlled, voltage controlled oscillator to the signal and at the same time displaying those signals so that an acoustical spectrum can be sampled and recorded until a desired signal is identified and then a second phase-locked-loop circuit is controlled to automatically track the received incoming signal and generate a reference signal which is coherent with the received signal and which is used by the holographic system to image the source of the received signal.

## ERRATA

For Classes 340—8, 340—174 and 340—384 see: Patents Nos. 3,789,400 thru 3,789,402

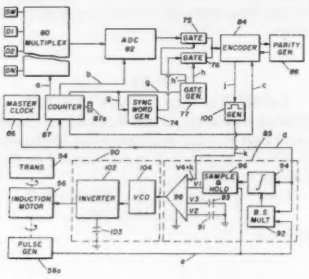
## 3,789,355
## METHOD OF AND APPARATUS FOR LOGGING WHILE DRILLING

**Bobbie J. Patton, Dallas, Tex., assignor to Mobil Oil Corporation, New York, N.Y.**

**Filed Dec. 28, 1971, Ser. No. 213,061**
**Int. Cl. G01v** *1/40*
**U.S. Cl. 340—18 LD** **13 Claims**

A method and apparatus is described for monitoring at a remote location downhole conditions encountered while drilling a well. A sensed downhole condition is represented by

a binary coded acoustic signal which is transmitted by way of a liquid path, provided by drilling liquid, to the surface of the earth. The acoustic signal, whose phase state represents bit values, is detected at the surface and decoded by way of a




coherent system. Coherency is provided by deriving from the received signal a reference signal which is compared with the received signal to produce an output representative of the sensed condition.

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**3,789,356**

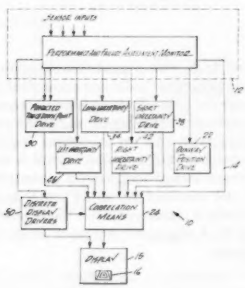
**MONITOR DISPLAY MEANS**

**Harold L. Harenberg, Jr., Long Beach, and James H. Shannon, Westminster, both of Calif., assignors to McDonnell Douglas Corporation, Santa Monica, Calif.**

**Continuation-in-part of Ser. No. 77,557, Oct. 2, 1970, abandoned. This application July 10, 1972, Ser. No. 270,379**

**Int. Cl. G08g** *5/02*

**U.S. Cl. 340—27 NA** **11 Claims**



A cockpit display for indicating the assessments made by a performance and failure assessment monitor of the overall performance of an automatic flight control system or of the pilot during the landing maneuver. The display processes signals from the monitor and operates thereon to display a representation of the runway, the expected landing point thereon and the relative uncertainty that the aircraft will land on the predicted spot. After landing the display may show the position of the aircraft on the runway and the expected lateral excursion thereof plus a discrete display of the distance the aircraft will travel before it can be stopped. Other discrete displays are also provided at critical times either to compliment the normal display or in substitution therefor.

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**3,789,357**

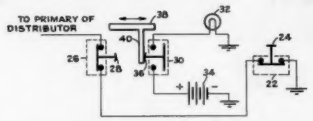
**SAFETY APPARATUS FOR DUMP TRUCKS**

**Albert W. Fritz, Jr., 411 Pear St., Pompano Beach, Fla.**

**Filed Nov. 8, 1972, Ser. No. 304,722**

**Int. Cl. B60q** *1/00*

**U.S. Cl. 340—53** **7 Claims**




Safety apparatus for a dump truck for indicating both opening of the tailgate and lifting of the dump truck bed if the tailgate is closed. A first switch is closed by lifting the bed. A second switch, in series with the first switch, is normally closed and is opened by opening the tailgate. The first and second switches are connected in series with the distributor of the truck, to stall the engine if the bed is lifted while the gate is closed. A second safety circuit includes a switch connected to generate a signal, such as by lighting a lamp, when the tailgate is opened.

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**3,789,358**

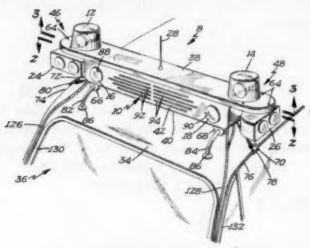
**POLICE UTILITY BAR**

**Richard D. Ellis, 6714 Dudley Ave., North, Minneapolis, Minn.**

**Filed Feb. 23, 1972, Ser. No. 228,666**

**Int. Cl. B60q** *1/52*

**U.S. Cl. 340—87** **6 Claims**



A police utility bar arranged to be mounted across the roof of a police car including a generally "T" shaped hollow housing, twin rotating lights, and a radio antenna mounted on the top surface of the housing, front running lights and a siren mounted in apertures in the front side of the housing, rear running lights mounted in apertures in the rear side of the housing, twin search lights pivotally mounted on the ends of the "T" shaped housing, and two mounting bosses arranged on the bottom surface of the housing to mount and support the utility bar on the roof of the police car in connection with arms extending from the bosses to the roof of the police car and in connection with straps extending from the bosses to the rain gutter of the police car with the lights and siren arranged to be operated and controlled from within the police car.

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**3,789,359**

**SYNCHRONISM INDICATOR FOR A CONVOLUTIONAL DECODER**

**George Cyril Clark, Jr., Indialantic, and Robert Curtis Davis, Melbourne Beach, both of Fla., assignors to Harris-Intertype Corporation, Cleveland, Ohio**

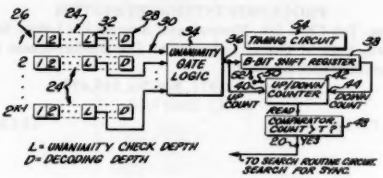
**Filed Oct. 4, 1972, Ser. No. 294,768**

**Int. Cl. G08c** *25/00*; **H04l** *1/10*

**U.S. Cl. 340—146.1 D** **9 Claims**

Apparatus for synchronizing a decoder of convolution codes with a received stream of convolutional code data.

Synchronization is achieved with respect to such problems as bit polarity inversion and incorrect boundaries of branch intervals by examining a number of trial message sequences. The trial message sequences are obtained by an algorithm suggested by Viterbi involving selection of one survivor sequence terminating in each data state of the code. When the decoder is synchronized with the received data stream, the survivor data sequences are very probably all identical at a branch interval near the older-data end of the sequences. When the decoder is not synchronized, the survivor sequences, with high




probability, differ from each other at that branch interval. Loss of synchronism is detected by simultaneously examining the survivor sequences at a branch interval located at a selected number L of branch intervals before the last-received data, L being less than or equal to the decoding depth. If the survivor sequences are not unanimous at depth L a count is registered. If the number of such counts occurring within a test period of B successive branch intervals exceeds a predetermined threshold T, branch synchronism is presumed to be incorrect and a search is initiated for correct synchronism.

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**3,789,360**

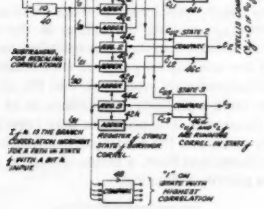
**CONVOLUTIONAL DECODER**

**George Cyril Clark, Jr., Indialantic, and Robert Curtis Davis, Melbourne Beach, both of Fla., assignors to Harris-Intertype Corporation, Cleveland, Ohio**

**Filed Oct. 13, 1972, Ser. No. 297,404**

**Int. Cl. H04l** *1/10;* **H03k** *13/34;* **G08c** *25/00*

**U.S. Cl. 340—146.1 AQ** **28 Claims**



A decoder for correcting and decoding convolutional data. Decoding of each digit of sequentially received data is postponed until a plurality of subsequent digits have been received. A message digit is then decoded by comparing the received sequence of data with a limited number of possible messages. The possible message which correlates best with the sequence of convolutional data that was received is temporarily assumed to be the correct sequence for purposes of decoding only the first message digit or perhaps the first few message digits of the data sequence currently being considered. The limited number of possible messages to be compared with the received data are selected at each branch interval by choosing one sequence terminating in each data state. During decoding, the possible messages are represented as sequences of branch transitions among a predetermined number of data states. The transitions among states are traced step by step through the possible message sequences to ascertain the data state of a survivor sequence at the decoding depth. The data state of the highest correlated survivor path is then interpreted into a decoded message bit.

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**3,789,361**

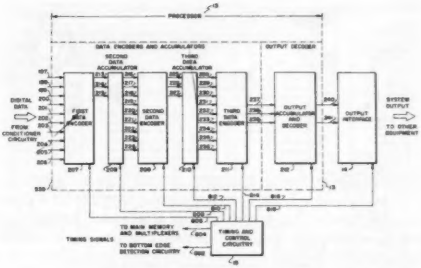
**RECOGNITION SYSTEM AND PROCESSOR**

**Edward Cortez, Rockville, Md., assignor to Fairchild Industries, Inc., Germantown, Md.**

**Filed Apr. 17, 1972, Ser. No. 244,504**

**Int. Cl. G06k** *9/12*

**U.S. Cl. 340—146.3 AQ** **9 Claims**



A recognition system for viewing and processing information on an article such as a letter or the like including an optical system for viewing the information, a diode array for converting the viewed image of the information into analog electrical signals, an amplifier for amplifying the analog electrical signals, an input conditioner for converting the amplified analog electrical signals into digital signals and a processor for processing the digital signals to compensate for errors which might be present in the information on the article and in the analog and digital signals.

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**3,789,362**

**INDICATING SYSTEM WITH LUMINOUS ELEMENTS**

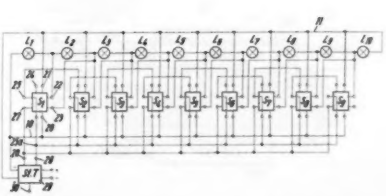
**Hans Prolss, and Wilhelm Hegeler, both of Hildesheim, Germany, assignors to Blaupunkt-Werke GmbH, Hildesheim, Germany**

**Filed May 10, 1972, Ser. No. 251,901**

**Claims priority, application Germany, May 13, 1971, 2123736**

**Int. Cl. H04f** *1/00*

**U.S. Cl. 340—147 LP** **10 Claims**



To control luminous elements, such as small lamps to indicate the received frequency on a scale of a communication receiver, by means of miniaturized electronic circuits without mechanically movable switches, the lamps are connected in a

series circuit across a source of supply. Solid state switches are connected to the junctions of the lamps in the series circuit, and having two states, the switches being so controlled that all switches preceding one which is connected to one source terminal are likewise connected to that one source terminal and all switches subsequent to the one which is connected to the one source terminal are connected to the other source terminal, so that only a single lamp will light.

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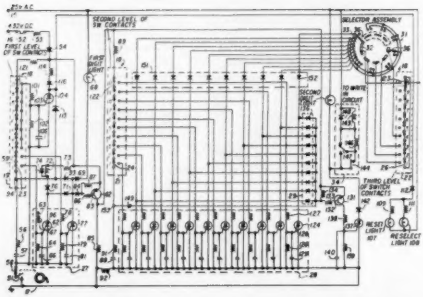
**3,789,363**

## SELECTOR SYSTEM FOR AUTOMATIC PHONOGRAPHS

**Ralph E. Petri, Chicago, Ill., assignor to Rock-Ola Manufacturing Corporation, Chicago, Ill.**

**Filed Oct. 13, 1972, Ser. No. 297,423**
**Int. Cl. G11b *19/08*; H04g *3/02***
**U.S. Cl. 340—162** **17 Claims**



A selector system for coin-operated automatic phonographs employing a plurality of manually operated pushbutton control switches, representing selection digits in conjunction with associated electronic circuitry having a "memory" or information storage capability whereby the activation of a record selector assembly and transfer mechanism to effect the play of a selected recording is preconditioned on predetermined operational sequencing of multiple control switches and circuits as programmed by specific digit combinations.

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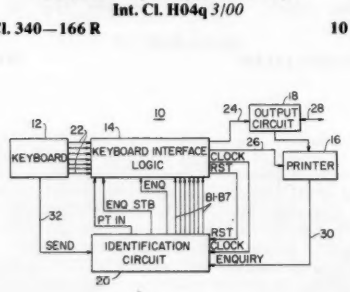
**3,789,364**

## ADDRESS CODE TERMINAL

**Donald J. Moses, Kettering, Ohio, assignor to The National Cash Register Company, Dayton, Ohio**

**Filed Mar. 17, 1972, Ser. No. 235,597**
**Int. Cl. H04q *3/00***
**U.S. Cl. 340—166 R** **10 Claims**




An identification circuit for use in a remote unit, such as a data terminal, is disclosed. The circuit includes a matrix assembled on a printed circuit board and associated logic means. The matrix includes a series of strips having holes. Message programming is accomplished by inserting a diode between corresponding holes of two strips to achieve proper row-column connections. The logic means causes a signal to be applied to the rows of the matrix, one at a time, and the signal appearing at the columns is the desired identification signal. One of the matrix columns is assigned to a stop bit and when this stop bit is detected, the logic means ceases applying the signals to the matrix rows and indicates that the identification message is completed.

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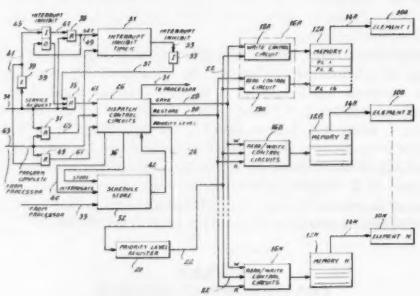
**3,789,365**

## PROCESSOR INTERRUPT SYSTEM

**Dixson Teh-Chao Jen, Monroe, and Amram Zvi Lotan, Stamford, both of Conn., assignors to The Bunker-Ramo Corporation, Oak Brook, Ill.**

**Filed June 3, 1971, Ser. No. 149,474**
**Int. Cl. G06f *9/18***
**U.S. Cl. 340—172.5** **16 Claims**



A method and apparatus for reducing the time required by a data processing system to perform interrupt save and restore operations. The number of required interrupts is reduced by delaying the input processing of service requests by a time which is less than the character time of the fastest device being served by the processor. At the end of the delay interval, an interrupt is generated, and all accumulated service requests processed at once. If the running program is completed during the delay interval, then all waiting service requests are processed at that time. The number of required interrupts is thus significantly reduced.

A memory device is provided for each processor element having values which must be saved when an interrupt occurs. When an interrupt occurs, the values in the elements are simultaneously written into the corresponding memory. When execution of the interrupted program is to resume, the stored values are simultaneously read back into the elements. Each memory may have a plurality of positions so as to permit the stacking of interrupts. The positions may correspond to program priority levels and the reading of information into, or the transfer of information from, a memory may be under control of a program priority indication.

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**3,789,366**

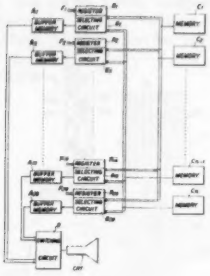
## RANDOM-ACCESS MEMORY DEVICE USING SEQUENTIAL-ACCESS MEMORIES

**Takayuki Itoh, Kawasaki, Japan, assignor to Takachiho Koeki Kabushiki Kaisha, Osaka-shi, Japan**

**Continuation-in-part of Ser. No. 26,881, April 9, 1970, abandoned. This application Aug. 15, 1972, Ser. No. 280,798**
**Claims priority, application Japan, Apr. 18, 1969, 44/29647**
**Int. Cl. G06f *3/14*; G11c *21/02***
**U.S. Cl. 340—172.5** **3 Claims**

A random-access memory device using at least one circulating main memory having a plurality of memory zones al-

located sequentially, and a plurality of circulating buffer memories each having a memory capacity equal to one-*h* th the memory capacity of the circulating main memory and each circulating in the same clock timing as the circulating main memory, the "h" being an integer more than two. Blocks of binary information stored in the main memory are successively read out to selected ones of the buffer memories by



selecting corresponding ones of the memory zones in response to zone selecting coded signals. The number of buffer memories is equal to twice the number of all memory zones of the circulating main memory. The buffer memories are divided into two groups of the same number. The contents of the circulating main memory or memories can be continuously read out by selecting one of the two groups and selecting the buffer memories of the selected group in the desired order.

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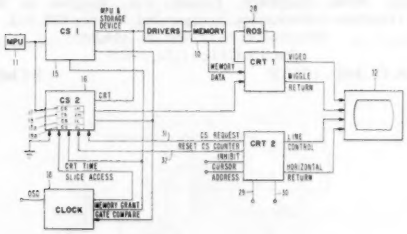
**3,789,367**

## MEMORY ACCESS DEVICE

**Eugene Francis Dumstorff; John Howard Iverson; Phillip Christian Schloss, and Philip Chuck-Yueh Wong, all of Rochester, Minn., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed June 29, 1972, Ser. No. 267,264**
**Int. Cl. G06f** *3/00, 13/00*
**U.S. Cl. 340—172.5** **9 Claims**



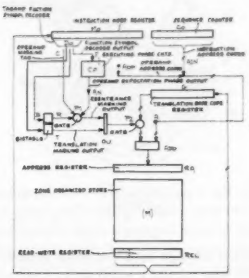

The specification describes a memory access technique wherein a display or other controlled device accesses sequential locations in memory without control unit intervention following an initial address and a selection of operating mode. An interfaced display continously displays data, status, prompting and/or operator guidance information from selected memory locations independent of the system control unit following mode select and an initial address. The display as shown includes a wiggle sweep cathode ray tube display controlled by a series of counters.

**3,789,368**

## PROGRAMME TRANSLATION AND REENTRANCE DEVICE

**Denis Derville, Paris, France, assignor to Compagnie International Pour L'Information, Louveciennes, France**

**Filed Apr. 12, 1972, Ser. No. 243,304**
**Claims priority, application France, Apr. 21, 1971, 7114102**
**Int. Cl. G11c** *7/00*
**U.S. Cl. 340—172.5** **5 Claims**



In a multi-programmation digital data system, each translation of a programme with respect to a store is controlled by an organization comprising a translation base code register, the content of said register pointing the zone of the store allotted to the instructions and data of the concerned programme and an adder which adds the content of said register to the addresses of the words of the said concerned programme prior their application to the address register of the store. According to the invention, there is provided a bistable member one of the outputs of which, when activated, marks a condition of translation of a programme and the other output of which, when activated, marks a condition of reentrance of a routine of a programme. Said bistable member is set at the beginning of a translation or a reentrance operation in the system and controls a logical organization which adds the content of said register to any and all addresses for a translation operation and to the addresses which, in a reentrant routine, concern parameters and variables whilst avoiding such an addition to the addresses concerning invariants of the routine.

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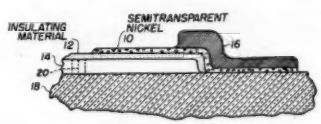
**3,789,369**

## THIN FILM MIS STORAGE DIODE

**Derek L. Lile, and David A. Collins, both of San Diego, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed July 10, 1972, Ser. No. 270,422**
**Int. Cl. G11c** *11/36, 11/42*
**U.S. Cl. 340—173 LS** **10 Claims**

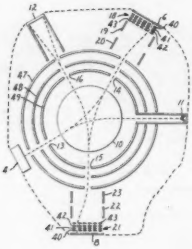



The method of storing information in a MIS light sensitive diode whose photovoltaic response may be altered reproducibly and reversibly by irradiation with suitable wavelength electromagnetic radiation or the temporary application of an electric voltage.

## 3,789,370
## MULTIPLE ELECTRON MIRROR APPARATUS AND METHOD

Jaime A. Bari; Kent N. Maffitt, both of Minneapolis, and Jerry A. Sievers, St. Paul, all of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed July 18, 1972, Ser. No. 272,779
Int. Cl. G11c *11/26*
U.S. Cl. 340—173 CR 26 Claims

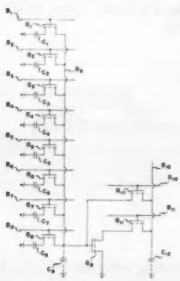


An information storage and retrieval system with a large storage capacity and having a write and a read mode of operation is provided by using a plurality of electron mirrors. Preferably three electron mirrors are used of which one is a modulating electron mirror and the other two are storage electron mirrors with each storage mirror having a plurality of storage areas. The electron beam is directed by a magnetic prism and appropriate biasing of the electron mirrors. During the write mode, the electron beam is mirrored by the modulating mirror and a page (a plurality of bits) of input information presented as a pattern of charge at the modulating mirror modulates the beam. The mirrored electron beam is directed to an addressed storage area of a selected storage mirror where the entire page of information contained in the modulated beam is stored as a pattern of charge. The same page can also be stored at the second storage mirror to improve the reliability of the apparatus during the read mode. During the read mode the electron beam is mirrored without modulation except at a storage mirror to be read where it is directed to a storage area for modulation and is then presented to a readout array where all bits of information represented by the modulation are read simultaneously.

## 3,789,371
## MOSFET MEMORY CELL

Seymour Markowitz, Palos Verdes, Calif., assignor to Lockheed Electronics Company, Inc., Plainfield, N.J.

Filed Nov. 20, 1972, Ser. No. 308,037
Int. Cl. G11c *13/00*
U.S. Cl. 340—173 R 4 Claims

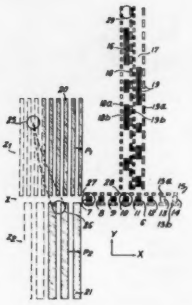


A MOSFET memory cell system wherein a plurality of one transistor per bit cells is combined with a three transistor switching circuit.

## 3,789,372
## SELF TRACKING BEAM ACCESSIBLE MEMORY AND ADDRESSING METHOD THEREFOR

Jean C. Lejon, 16, boulevard Soult, 75012 Paris, France

Filed Jan. 29, 1973, Ser. No. 327,811
Claims priority, application France, Jan. 27, 1972, 7202676
Int. Cl. G11c *5/02, 7/00*
U.S. Cl. 340—173 CR 17 Claims

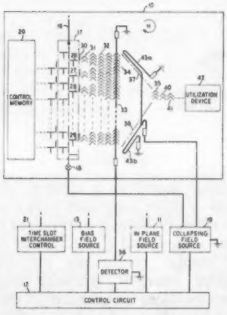


A light beam or an electron beam is deflected by analog methods to one of a plurality of acceptance zones, each serving a multiplicity of words arrayed in one dimension of the memory and accessed by a word selection line or stripe directed in the other dimension of the array. Each word selection line is an extension of a median line of the acceptance zone to which it relates. Pairwise distinctive guiding means are provided in each acceptance zone on either side of the median and as borders on either side of each word selection stripe, of such a kind as to generate a pair of distinctive signals when swept by the access beam. From these signals an error signal is derived and applied to the deflection circuits to provide tracking of the beam. Counting spots on the word selection stripe enable digital circuits to stop the sweep at the precise word address, after which the word is swept to read or write information. Beam tracking may also be provided for word stripes in the same manner as for word selection stripes.

## 3,789,373
## MAGNETIC, SINGLE WALL DOMAIN, OR LOGIC USING CHEVRON DOMAIN PROPAGATING ELEMENTS

Peter Istvan Bonyhard, Edison, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Nov. 6, 1972, Ser. No. 304,049
Int. Cl. G11c *11/14, 19/00*
U.S. Cl. 340—174 TF 8 Claims




Magnetic single wall domain expanders in adjacent domain propagation channels are edge-merged into a common detec-

tor stage so that a domain from any of the channels is electrically detectable at that stage. A domain compressor provides magnetic output. The channels in one embodiment are control-memory-gated outputs from different stages of a shift register that is operable in a time slot interchanging mode.

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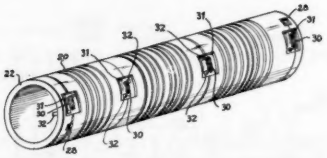
3,789,374

**DOMAIN WALL PROPAGATING DEVICE**

**Philip Sherman, San Diego, Calif., assignor to Instrument Development Laboratories, Inc., Wantagh, N.Y.**

**Filed Sept. 14, 1972, Ser. No. 288,895**
**Int. Cl. G11c** *19/00, 11/04*
**U.S. Cl. 340—174 PW** **9 Claims**



A domain wall propagating device with a magnetic wire wound in grooves on a substrate. Coils wound around the wire are placed in recesses in the substrate. A propagating winding is wrapped around the substrate, and the device may be covered with a magnetic shielding layer. To avoid damaging the magnetic wire during the fabrication of the device, the coils are wound on a tubular mandrel through which the magnetic wire extends. The magnetic wire may be supported in a channel formed between a pair of non-magnetic wires bonded together.

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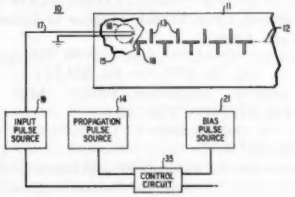
3,789,375

**SINGLE WALL DOMAIN NUCLEATOR**

**Yu-Ssu Chen, New Providence; Joseph Edward Geusic, Berkeley Hgts.; Terence John Nelson, New Providence, and Herbert Meyer Shapiro, Bridgewater, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Nov. 3, 1972, Ser. No. 303,327**
**Int. Cl. G11c** *11/14*
**U.S. Cl. 340—174 TF** **11 Claims**



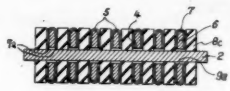

A new mechanism for bubble domain generation permits nucleation with less power than previously expected. A nucleation pulse of a particular form enables the mechanism to be employed without reducing the effective difference between the propagation and nucleation thresholds which impart stability to bubble arrangements.

3,789,376

**MATRIX MEMORY DEVICE OF HIGH BIT DENSITY**

**Shintaro Oshima; Toshihiko Kobayashi, both of Tokyo; Tetsusaburo Kamibayashi, Niza; Akira Okada; Yoshihisa Komazawa, both of Tokyo, and Keigo Komuro, Kanagawa-ken, all of Japan, assignors to Kokusai Denshin Denwa Kabushiki Kaisha, Tokyo-to, Japan**

**Continuation-in-part of Ser. No. 12,393, Feb. 18, 1970, abandoned. This application Nov. 27, 1972, Ser. No. 309,679**
**Int. Cl. G11c** *11/14, 11/04*
**U.S. Cl. 340—174 PW** **5 Claims**



A matrix memory device comprising a set of parallel row magnetic lines arranged equally spaced and two sets of parallel column conductive lines arranged equally spaced so as to intersect orthogonally with the row magnetic lines so that one and the other of the two sets of parallel column conductive lines hold insulatively the set of parallel row magnetic lines therebetween to provide memory cells at intersections between the row magnetic lines and the column conductive lines, where at least one set of the two sets of parallel column conductive lines comprises parallel ribbon conductors each having a height more than twice a width thereof and coated with a ferromagnetic thin film except an edge line directed to the row magnetic lines and fixed in an insulation sheet to reduce effectively interference between adjacent memory cells.

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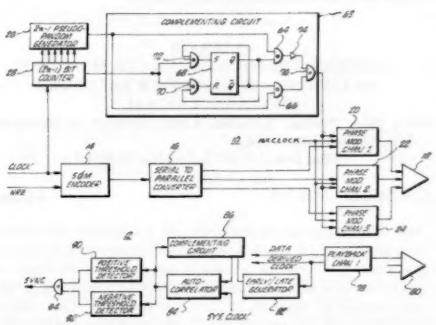
3,789,377

**PSEUDO-RANDOM SEQUENCE SYNCHRONIZATION FOR MAGNETIC RECORDING SYSTEM**

**Kermit A. Norris, Duarte, Calif., assignor to Lockheed Electronics Company, Inc., Burbank, Calif.**

**Filed May 26, 1972, Ser. No. 257,374**
**Int. Cl. G11b** *5/02*
**U.S. Cl. 340—174.1 G** **12 Claims**




A synchronization technique for multiple channel magnetic recording systems, is disclosed. The synchronization technique involves the phase modulation of data to be recorded on each of several parallel recording channels in accordance with a repeated pseudo-random sequence. Upon recovery of recorded signals in the respective channels, the phase modulation is detected to reconstruct the pseudo-random sequence which is then auto-correlated to produce a synchronization pulse once each cycle of the pseudo-random

sequence. The synchronization pulses may be employed to overcome the effects of tape skew, jitter, or the like.

### 3,789,378
### TRANSDUCER POSITIONING MECHANISM

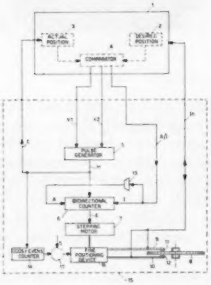
**Giorgio Bonzano, Montalto Dora; Pier Carlo Lesca, Palazzo Canavese, and Luigi Ponzano, Ivrea, all of Italy, assignors to Ing. C. Olivetti & Co. S.p.A., Ivrea (Torino), Italy**

**Filed May 23, 1972, Ser. No. 256,022**

**Claims priority, application Italy, May 24, 1971, 68737 A/71**

**Int. Cl. G11b** *5/56*

**U.S. Cl. 340—174.1 C** **4 Claims**



In a magnetic disc store system, transducers are positioned over tracks on the discs by a stepping motor controlled by a central unit which sends signals over three channels commanding first and second pulse frequencies to be emitted from a pulse generator, which frequencies are applied to a bidirectional counter. The counter controls the motor and the pulses are fed back to the central unit and are there counted to indicate actual transducer position. When the transducers reach the selected position, fine positioning is effected by a push rod which engages a wedge between teeth of a rack attached to the transducers. There is further disclosed an improved mechanism for interchanging disc cartridges with automatic opening and closing of the shutter through which the transducers are introduced and positioned.

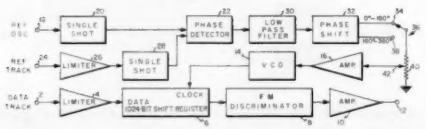
### 3,789,379
### COMPENSATION OF REPRODUCED SIGNAL BY MEASURING A DEVIATION OF RECORDED REFERENCE SIGNAL

**Ivars Peter Freikss, Littleton, Colo., assignor to Honeywell Inc., Minneapolis, Minn.**

**Filed Feb. 23, 1973, Ser. No. 335,307**

**Int. Cl. G11b** *5/44*

**U.S. Cl. 340—174.1 H** **6 Claims**




A playback circuit has a first frequency modulated discriminator for discriminating a reference signal reproduced from a recording medium and a second frequency modulated discriminator for discriminating a data signal reproduced from the same recording medium as the reference signal. A shift register storage means is arranged to store the reproduced data signals and to apply them to the second discriminator at a rate determined by a clock signal produced by a voltage controlled oscillator driven by an output signal from the first discriminator.

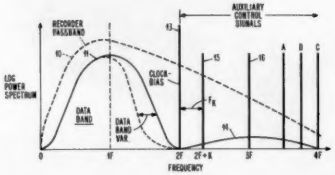
### 3,789,380
### DIGITAL RECORDING AT TWICE NYQUIST BANDWIDTH

**Maxwell R. Cannon, Boulder, Colo., assignor to International Business Machines Corporation, Armonk, N.Y.**

**Division of Ser. No. 229,214, Feb. 18, 1972. This application Apr. 9, 1973, Ser. No. 349,574**

**Int. Cl. G11b** *5/02*

**U.S. Cl. 340—174.1 G** **48 Claims**




A digital magnetic recorder uses up to twice the Nyquist bandwidth of a data signal, plus a clock signal at a frequency exactly equal to the bit rate for reliably exchanging data signals with a magnetic media. The frequency response of the recording system is greater than twice the Nyquist bandwidth of the data signals to be recorded. Optionally, additional control signals at frequencies above or below the clock frequency but within the available recorder bandwidth may be recorded. Preferably, in a multitrack magnetic recording system, a signal component is added at a frequency near the clock frequency such that the difference between this signal and the clock has a wavelength on the magnetic media greater than the maximum skew of the multi-track system. Such signal component is usable as a resynchronization pattern. Additionally, write errors are detected during recording with special control indicia recorded on the media indicating such errors. Various forms of indicia are described including special data patterns, special signal components, and the like.

### 3,789,381
### DEVICE FOR MEASURING THE SPECIFIC CONSUMPTION OF INTERNAL COMBUSTION ENGINES

**Jean Paul Sibeud, Lyon, France, assignor to Automobiles M. Berliet, Lyon, France**

**Division of Ser. No. 43,790, June 5, 1970. This application Aug. 30, 1972, Ser. No. 284,711**

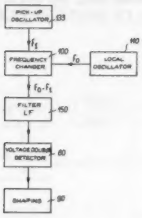
**Claims priority, application France, June 6, 1969, 69/18802; Feb. 11, 1970, 70/04845**

**Int. Cl. G08c** *19/12, 19/06*

**U.S. Cl. 340—207 R** **2 Claims**

In a device for the accurate measurement of the specific fuel consumption of internal combustion engines, which utilizes a scale having a pointer movable in front of a dial, the measuring scale carries detector or pick-up means comprising each a first transistorized oscillator circuit with a frequency modulated inductance-capacitance circuit, a second oscillator circuit generating a fixed reference frequency signal, a frequency changer receiving the first and second oscillator circuits signals, a low pass filter means to which is transmitted a reference frequency signal which corresponds to the difference of frequencies of the signals received by the frequency signal, a signal detector connected to the filter and rectifying

through a doubler the HF voltage having passed through the filter and a shaping device connected to the output of the detector for delivering at a low impedance value a high-amplitude logic signal.

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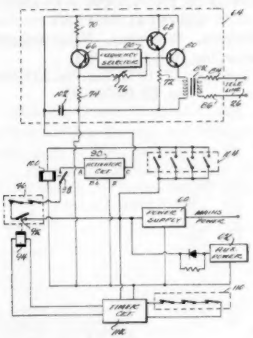
**3,789,382**

## ALARM SYSTEM WITH CENTRAL STATION MONITORING OF KEY OPERATED LOCKS OF A NUMBER OF REMOTE STATIONS

**Warren J. Oestreicher, Salt Lake City, Utah, assignor to Centralalarm International, Inc., Salt Lake City, Utah**

**Filed Aug. 11, 1972, Ser. No. 279,782**
**Int. Cl. G08b** *13/06*
**U.S. Cl. 340—213 R** **13 Claims**



An alarm system with a plurality of sensors at a protected premises, a transmitter circuit connected to the sensors for transmitting a pure sinusoidal signal whose frequency identifies the premises and for ending transmission or modulating the sinusoidal signal whenever one of the sensors detects an alarm condition, a central station connected to a number of receivers for providing an alarm signal when a sensor detects an alarm, a telephone line connecting the transmitter to the central station and an activating circuit at the protected premise including a reed switch mounted within a housing on the interior of the door with a momentary switch and light mounted on the same housing, a key operated tumbler having a magnet mounted thereon on the exterior of the door opposite the housing for closing the reed switch to activate the system.

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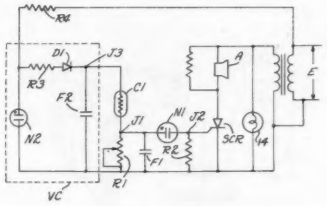
**3,789,383**

## SMOKE DETECTOR WITH MEANS FOR COMPENSATING FOR VARIATIONS IN LIGHT SOURCE BRIGHTNESS DUE TO LINE VOLTAGE VARIATIONS

**Alfred W. Vasel, Abington, Mass., assignor to Pyrotector Incorporated, Hingham, Mass.**

**Filed Dec. 13, 1971, Ser. No. 207,461**
**Int. Cl. G08b** *21/00*; **G05f** *3/04*
**U.S. Cl. 340—237 S** **5 Claims**




A smoke detector having voltage control circuit for compensating for changes in light brightness caused by variations in line voltage. The voltage control circuit comprises a voltage regulating circuit that provides a higher voltage across the photo-cell detector when the line voltage is lower than normal, and vice versa.

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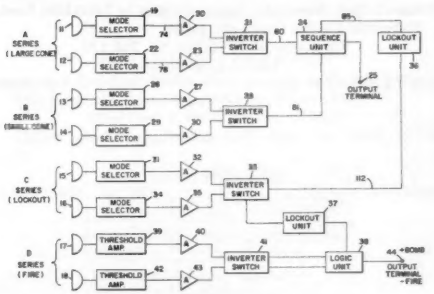
**3,789,384**

## SECURITY SYSTEM OPERATED BY CHANGES IN LIGHT AT SPECIFIED LOCATIONS

**Artie E. Akers, Long Beach, Calif., assignor to Lawrence Security Inc., San Francisco, Calif.**

**Continuation-in-part of Ser. No. 140,808, May 6, 1971. This application Dec. 29, 1972, Ser. No. 319,445**
**Int. Cl. G08b** *13/00*
**U.S. Cl. 340—258 B** **19 Claims**

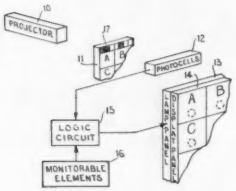



A security system for the detection of moving targets such as intruders and also of fire and explosions. A plurality of sensors such as photoelectric cells or infrared detectors are focused in an inner and outer pattern, such as pairs of nearly coaxial cones, of different slope, for example, to create inner and outer zones of intrusion. The outputs from the sensors are coupled through a sequencing unit which is programmed to yield an output only when intrusion into the inner zone follows intrusion into the outer zone no more quickly than after a predetermined time delay. A fire detection system places sensors in an area to be protected, utilizing the same general type of operation as the intruder protection with some differences. A plurality of lockout sensors sensing ambient light conditions to lockout the sequencing units of the intrusion detection system and fire detection system if the changes are due to changes in the ambient light.

## 3,789,385
## ERROR INDICATING DISPLAY

Christopher Philip Burton, Alderley Edge, England, assignor to International Computers Limited, London, England

Filed June 7, 1972, Ser. No. 260,423
Claims priority, application Great Britain, June 10, 1971, 27,364/71
Int. Cl. G09f 9/42
U.S. Cl. 340—324 R 3 Claims

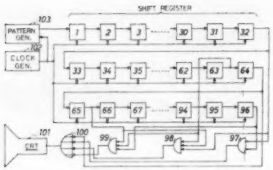



In a display system for indicating error conditions in groups of registers. The names of a group of registers are carried on an exchangeable slide from which they are projected on to a screen. An array of lamps is positioned behind the screen, one lamp being associated with each register name. A code area on each slide is sensed to identify the particular group of registers corresponding to the names on the slide and to control the connection of each one to its associated lamp thus to provide a visual indication of the state of each register in the group.

## 3,789,386
## RESTORATION SYSTEM FOR PATTERN INFORMATION USING AND-TYPE LOGIC OF ADJACENT BITS

Takayuki Itoh, Kawasaki, Japan, assignor to Takachiho Koeki Kabushiki Kaisha, Osaka-shi, Japan

Filed June 30, 1972, Ser. No. 268,137
Int. Cl. G06f 3/14
U.S. Cl. 340—324 AD 6 Claims

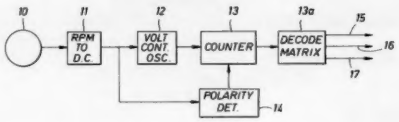



A restoration system is disclosed for restoring omitted dots of dot-typed patterns indicated by an alternate arrangement of black dots and white dots in bilateral scanning lines and vertical scanning lines in which some dots of each of the dot-typed patterns omitted in a pattern generator or in the transmission medium because of noise are restored irrespective of the states of the dots if upper and lower dots and right and left dots adjacent to each of the omitted dots assume predetermined states determined in consideration of the characteristics of the patterns. The dot-typed omitted pattern is temporarily stored in a shift register, and AND logic operations are performed by use of AND circuits to detect the predetermined states.

## 3,789,387
## DYNAMIC MOTION DISPLAY SYSTEM

John B. Hurst, 6445 Brompton St., West University Pl., Dickinson, Tex.

Continuation of Ser. No. 78,881, Oct. 7, 1970, abandoned.
This application Aug. 16, 1972, Ser. No. 281,209
Int. Cl. G01f 15/06; G09f 9/36
U.S. Cl. 340—325 13 Claims

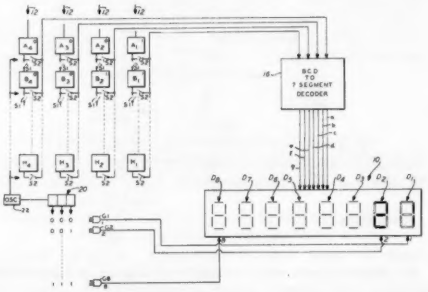



A display system is disclosed for illustrating rotation of pumps, motors or the like, or flow of fluids through pipes in two directions. An electrical signal is derived from the motion device in the form of pulses which are proportional to speed, flow or any other measured parameter. The derived pulse is converted to sequentially coded signals which, in turn, are used to sequentially illuminate a display means. The display means may take the form of superimposed luminescent panels respectively having luminescent indicia sequentially displayed thereon so that sequential illumination of the panels will create the illusion of motion. Alternatively, the display means can be composed of a display member in which sequential luminescent indicia are respectively illuminated by sequential operation of fiber optic bundles. In another alternative form, electrically illuminescent paint or crystals may be disposed on a panel in an indicia for sequential illumination to create the illusion of motion.

## 3,789,388
## APPARATUS FOR PROVIDING A PULSED LIQUID CRYSTAL DISPLAY

Albert H. Medwin, Whippany, N.J., assignor to Ragen Semiconductor, Inc., Whippany, N.J.

Filed Mar. 17, 1972, Ser. No. 235,643
Int. Cl. G09f 9/32
U.S. Cl. 340—336 1 Claim

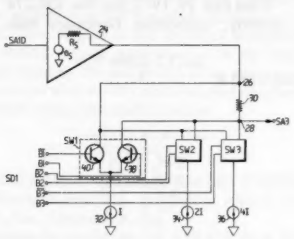



A body of liquid crystal material, normally in a transparent state whose turn-on period for changing into a light scattering state is less in duration than its decay period for returning to the transparent state, is supplied with an intermittent electric field which varies from a potential which is below the turn-on threshold potential of the liquid crystal material to a potential which is equal to or above the threshold or turn-on potential when the light scattering state is desired. The intermittent electric field is refreshed at a sufficiently rapid rate such that to the eye of a human observer the body of liquid crystal material appears to be "on" or in the light scattering state continuously.

## 3,789,389
## METHOD AND CIRCUIT FOR COMBINING DIGITAL AND ANALOG SIGNALS

John G. Lenhoff, Jr., Linthicum, Md., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed July 31, 1972, Ser. No. 276,288
Int. Cl. H03r 13/17
U.S. Cl. 340—347 AD 12 Claims

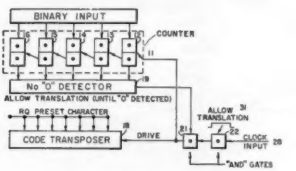



A method and circuit for varying the amplitude of an analog signal in response to a digital signal particularly suited for use in subranged analog to digital converters. The analog signal is applied to one of two junctions interconnected by an impedance such as a resistor and an output signal is taken from the other of the two junctions. A constant current from one or more sources is selectively switched from one of the junctions to the other in response to the digital signal to thereby modify the amplitude of the analog signal by a discrete amount. The total current flow at the junction to which the analog signal is applied and attributable to the constant current source remains essentially constant irrespective of switching thereby minimizing the effects of switching transients. When utilized in connection with a subranged analog to digital converter, the invention eliminates the need for a differential amplifier or other subtracting circuit.

## 3,789,390
## SERIAL CODE TRANSLATOR

Donald C. Burkness, Silver Spring, and William W. Warlick, Jr., Annapolis, both of Md., assignors to the United States of America as represented by the Secretary of the Army

Filed Oct. 7, 1971, Ser. No. 187,246
Int. Cl. H04l 3/00
U.S. Cl. 340—347 DD 17 Claims

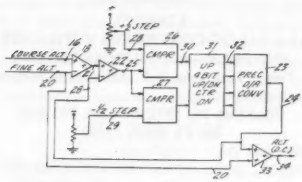



A serial scheme of translation between binary numbers and constant-ratio codes utilizing two storage devices and a train of clock pulses. As one storage device containing the number to be translated is counted down to a reference value, the other storage device is simultaneously counted up from a reference value to the equivalent number. If the number to be translated is a binary number, the equivalent number will be in constant ratio code, and vice-versa.

## 3,789,391
## COURSE/FINE SYNCHRO ALTIMETER CONVERTER

Larry D. Brock, Collinsville; John E. Games, Granby, and John Saunders, East Hartford, all of Conn., assignors to United Aircraft Corporation, East Hartford, Conn.

Filed July 3, 1972, Ser. No. 268,254
Int. Cl. H03k 13/02
U.S. Cl. 340—347 SY 8 Claims

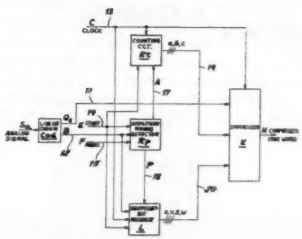



A DC signal representative of the rotary position of a fine synchro altimeter is subtracted from a DC signal representative of the angular position of a coarse synchro altimeter so as to provide a coarse staircase, the step positions of which are accurately aligned with the fine altimeter transition from maximum to minimum altitude indication. This staircase is used to select corresponding voltages, stepwise fashion, which are precisely generated so as to generate a staircase in which the voltage levels, as well as the positioning of the steps, are extremely precise. The fine altimeter voltage is added to the precise staircase so as to generate a precise DC signal of altitude. The voltage outputs of the fine synchro altimeter are resolved to a smooth, linear voltage as the function of altitude by means of electronic resolution equipment employing an RC/CR bridge, the input signals of which are reversed for a range of shaft angles displaced from 0° and 360° rotation; angular and voltage biases are also provided in this signal conditioning.

## 3,789,392
## BINARY-CODE COMPRESSOR

Giampiero Candiani, Milan, Italy, assignor to Societa Italiana Telecommunicazioni Siemens S.p.A., Milano, Italy

Filed Sept. 2, 1971, Ser. No. 177,325
Claims priority, application Italy, Sept. 15, 1970, 29740 A/70
Int. Cl. H03r 13/24
U.S. Cl. 340—347 DD 13 Claims




A 12-bit word, including a polarity of sign bit $Q_s$ and up to seven initial zeroes preceding a group of significant bits, is converted into a compressed eight-bit word which retains the sign bit $Q_s$ in first position and four significant bits X, Y, Z, W in the last positions; the intervening three bits are the binary equivalent of the number of initial zeroes. These intervening

bits are generated by a three-stage reverse counter which is loaded by a starting pulse after arrival of the sign bit and is stepped by successive clock pulses, stopping after seven cycles at the count 0 unless cut off earlier by the arrival of the first "one" following the sign bit in the original word. This first "one", or a timing pulse occurring seven cycles after the starting pulse, initiates the stepping of a shift register in which the bits X, Y, Z, W are entered for subsequent transfer to a synthesizing register also receiving the sign bit Q, and the reading of the reverse counter.

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**3,789,393**

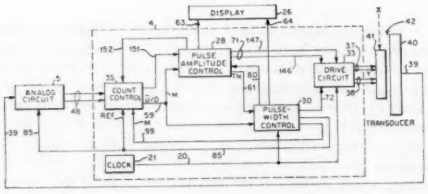
**DIGITAL/ANALOG CONVERTER WITH AMPLITUDE AND PULSE-WIDTH MODULATION**

**Robert W. Tripp, Tuckahoe, N.Y., assignor to Inductosyn Corporation, Valhalla, N.Y.**

**Filed Oct. 26, 1972, Ser. No. 301,030**

**Int. Cl. H03k *13/02***

**U.S. Cl. 340—347 DA** **10 Claims**




Disclosed is a digital-to-analog position-measuring apparatus in which the position-measuring transducer is energized by a combination of differently modulated signals. In one preferred embodiment of the present invention, trigonometrically related (sine-cosine) pulse-width modulated signals are trigonometrically summed with pulse-amplitude modulated signals. The pulse-amplitude modulated signals comprise the fine bits and the pulse-width modulated signals comprise the coarse bits of the apparatus of the preferred embodiment of the present invention.

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**3,789,394**

**DEVICE FOR THE EMISSION OF CURRENT-PULSE TRAINS PARTICULARLY BY TELEPHONE AND TELEPRINTER INSTALLATIONS**

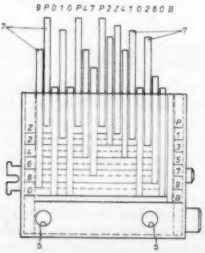
**Anton Schaumann, 7701 Volkertshausen, Reuteberg, and Willi Weber, 7701 Volkertshausen, Boriesried, both of Germany**

**Filed Aug. 18, 1972, Ser. No. 281,959**

**Claims priority, application Germany, Aug. 27, 1971, 2142870**

**Int. Cl. G06f *3/02***

**U.S. Cl. 340—365 R** **35 Claims**



A device, especially adapted for incorporation in telephones and teleprinters in which a preset cassette is inserted into a reader and is operable to control pulse developing circuit means so as to emit a series of pulses programmed in conformity with the preset condition of the respective cassette.

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**3,789,395**

**ELECTRO-MECHANICAL POSITION INDICATOR**

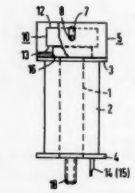
**Hans Michels, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany**

**Filed Feb. 29, 1972, Ser. No. 230,274**

**Claims priority, application Germany, Mar. 17, 1971, 212854**

**Int. Cl. G08b *5/24***

**U.S. Cl. 340—373 R** **6 Claims**



The indicator consists of a coil wrapped around an iron core and a visual target which is rotatably and displaceably supported and which contains a permanent magnet. Upon reversal of the magnetic field in the iron core produced by the coil, the permanent magnet of the visual target is repelled, rotated 180° by the magnetic forces and again attracted. The new position of the visual target is thereby fixed, even if current no longer flows through the coil.

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**3,789,396**

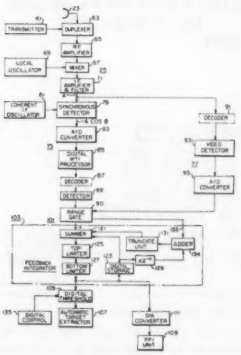
**RADAR APPARATUS**

**John W. Taylor, Jr., Baltimore, Md., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Mar. 6, 1972, Ser. No. 232,150**

**Int. Cl. G01s *9/02***

**U.S. Cl. 343—5 DP** **18 Claims**



There is disclosed radar apparatus including a digital feedback indicator which, while including a minimum number of bits, is more precise, - for example, its precision is adequate for automatic target detection - more flexible and more stable than prior-art feedback integrators in which delay lines are used for storage elements. The apparatus includes a feedback

integrating network having digital storage in which is stored, simultaneously for each range cell, a number corresponding to the echo signal newly received at any instant and decremented numbers corresponding to the echo signals previously received. The integrator is supplied with signals of a limited dynamic range to prevent the detection of non-synchronous intereference pulses, regardless of their strength. The integrator includes a top limiter which prevents the accumulation of a strong synchronous echoes to an excessive stored value, a bottom limiter which assures the receipt by the storage of at least a minimum number, and bias which sets the median of the noise in the storage near the minimum number set by the bottom limiter. Two outputs of the feedback integrator are provided: an analog voltage proportional to the stored digital number representing the integrated echo signals, and a Yes-No decision as to whether the stored digital number exceeds a predetermined digital threshold number.

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**3,789,397**

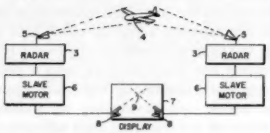
## THREE DIMENSIONAL DISPLAY SYSTEM

**James W. Evans, Largo, Fla., assignor to Athletic Swing Measurement, Inc., Clearwater, Fla.**

**Continuation-in-part of Ser. No. 858,628, Sept. 17, 1969, abandoned. This application Dec. 10, 1971, Ser. No. 206,615**

**Int. Cl. G01s** *7/04*

**U.S. Cl. 343—7.9** **4 Claims**




A display system for indicating in three dimensions and to a selected scale the position of a remotely observed body or bodies in three dimensional space, the system employing a three dimensional display region and at least two spaced, trainable laser beam assemblies, each of which directs a laser beam along a line which simulates to scale a line of actual direction to the body being observed, and the position of a body being indicated by spot illumination occurring at the intersection of the two beams.

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**3,789,398**

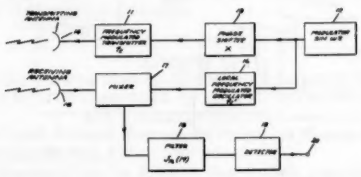
## FM-CW RADAR RANGE SYSTEM

**Stephen J. Erst, New Haven, Ind., assignor to International Telephone and Telegraph Corporation, Nutley, N.J.**

**Filed Mar. 12, 1959, Ser. No. 799,048**

**Int. Cl. G01s** *9/24*

**U.S. Cl. 343—14** **12 Claims**



5. A continuous wave radar system comprising: a source of sine wave signals; first means for frequency modulating a carrier frequency with said sine wave signals to provide a first frequency modulated signal; means for transmitting said first frequency modulated signal; second means for frequency modulating a carrier frequency with said sine wave signals to provide a second frequency modulated signal, the carrier frequency of said second frequency modulating means being the same as the carrier frequency of said first modulating means; phase shifting means coupled between said source of sine wave signals and one of said modulating means; means for receiving said first frequency modulated signal reflected from a distant object; means for mixing the received signal with said second frequency modulated signal; band pass filter means coupled to the output circuit of said mixing means and tuned to pass one side band component at least as high as the sixth contained in the output from said mixing means; and detector means coupled to said band pass filter means; and means for providing a fixed phase displacement between said transmitted signal and said other frequency modulated signal sufficient to provide in said one side band a first response peak at close range and a second response peak at a substantially greater range with no response peaks therebetween.

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**3,789,399**

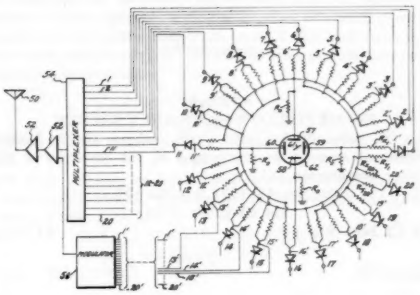
## FREQUENCY DISCRIMINATOR DEVICE

**Arthur L. Blymiller, Rome, and John E. Snodgrass, Oneida, both of N.Y., assignors to The United States of America as represented by the Secretary of the United States Air Force, Washington, D.C.**

**Filed Sept. 28, 1961, Ser. No. 141,548**

**Int. Cl. G01s** *9/23, 9/24*

**U.S. Cl. 343—14** **5 Claims**



1. A frequency discriminator for monitoring over a wide frequency range of radar pulsed transmission comprising multiplexing means for receiving a plurality of signal pulse trains having progressively differing pulse repetition rates, a plurality of filter means having progressively varying pulse frequency reception rates spanning the range of variation in the pulse repetition rates of said plurality of signal pulse trains, coupling means between said multiplexing means and said filter means whereby each pulsed signal is channelized by said multiplex means into the input of a corresponding channel filter means, a plurality of voltage resolving means receiving the output of at least three of said filter means, and means for indicating the voltage resolution pattern registered at said voltage resolving means.

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**3,789,400**

## APPARATUS FOR DESKEWING DATA SIGNALS IN A MULTI-TRACK RECORDING SYSTEM

**Marion L. Towns, Bethany, Okla., assignor to Honeywell Information Systems, Inc., Waltham, Mass.**

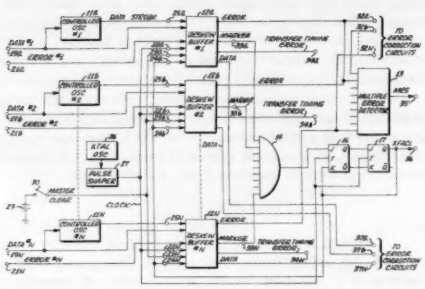
**Filed Jan. 26, 1973, Ser. No. 326,707**

**Int. Cl. G11b** *5/44*

**U.S. Cl. 340—174.1 B** **10 Claims**

Apparatus for deskewing data signals in a multi-track recording system uses a controlled oscillator and a deskewing

buffer for each of the data tracks. Each buffer includes a data shift register, an error shift register and a marker shift register with each register having a plurality of storage cells. The apparatus uses the controlled oscillator and the data signals to



produce marker bits in each buffer. The marker bits are used to synchronously move the error signals and data signals in the buffers and to generate a transfer signal each time a data character has been deskewed.

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**3,789,401**

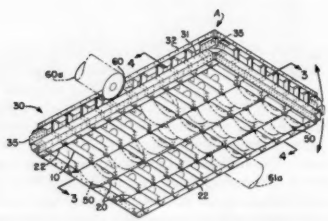
**FRAME FOR LOW FREQUENCY SOURCE**

**John W. Behrendt, La Jolla, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Feb. 16, 1971, Ser. No. 115,355**

**Int. Cl. H04b** *13/00*

**U.S. Cl. 340—8 S** **8 Claims**



A transducer array is supported by a plurality of interconnected longitudinal and lateral fiber-glass members which terminate in a rigid, rectangular frame work defining the limits of a transducer mounting area. All points of juncture between the fiber glass members and the rigid framework are frictionally secured to induce no coupling-induced internal stresses at the juncture points. By mounting the high-energy transducer elements on the fiber-glass members, a tendency for resonance and sympathetic vibration within the supporting structure is dampened to within tolerable limits. Contemporary, rigid frameworks, especially those frameworks that are welded together, resonate with the projection of high-energy acoustic power and tear themselves apart.

**3,789,402**

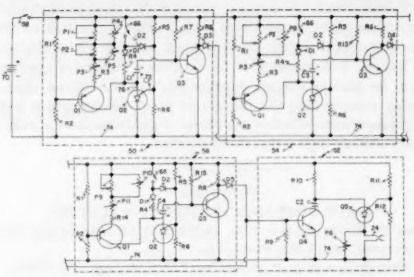
**ELECTRONIC SIGNAL DEVICE AND METHOD**

**Richard D. Heywood, 1512 E. Dolphin, Mesa, Ariz., and Charles E. Seagle, 4686 Sycamore Dr., Salt Lake City, Utah**

**Filed Apr. 1, 1971, Ser. No. 130,284**

**Int. Cl. G08b** *3/00*

**U.S. Cl. 340—384 E** **10 Claims**



A completely self-contained portable signal device and method including individually programmable timer circuitry which, for example, (a) signals a proper striding sequence by combining a selected lap rate and a selected stride length and electronically reduces the combined information to an audible sound pattern representing a precise stride rate selected for the individual; (b) signals proper spacing over a track by electronically dividing the track distance into a predetermined plurality of segments, combining the track distance with a selected time period and developing an audible sound at spaced time intervals representing each segment of the track distance; and/or (c) signals time increments at any regular interval to define the limits of running and rest periods. The method includes programming the signal device for the specific needs and requirements of use as to striding, spacing or timing or any combination of those functions.

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**3,789,403**

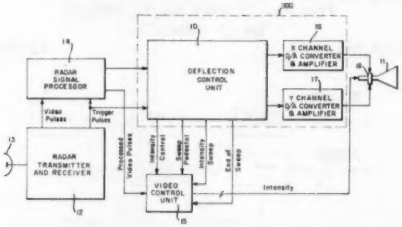
**DIGITAL LINE GRAPHICS CONTROL ON RANGE SCALABLE RADAR CRT DISPLAY**

**Rudolph Dalena, Placentia; Roy K. Onishi, Anaheim, both of Calif., and Donald F. Walker, Boulder, Colo., assignors to Hughes Aircraft Company, Culver City, Calif.**

**Filed July 24, 1972, Ser. No. 274,544**

**Int. Cl. G01s** *7/22*

**U.S. Cl. 343—5 DP** **13 Claims**




In a radar PPI display, the cathode-ray tube beam is intensified during a selected sweep in a predetermined pattern to generate an identifying pattern of line segments or dots on the sweep. The pattern is controlled by a range counter used to generate the sweep. Upon scaling the range, the clock pulse rate to the range counter is changed, thereby permitting the same stage, or stages, of the range counter to control intensification of the range sweep.

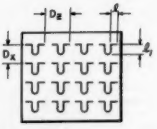
## 3,789,404
## PERIODIC SURFACE FOR LARGE SCAN ANGLES

**Benedikt A. Munk, Columbus, Ohio, assignor to The Ohio State University Research Foundation, Columbus, Ohio**

**Filed Oct. 16, 1968, Ser No. 768,142. The portion of the term of this patent subsequent to Aug. 29, 1989, has been disclaimed.**

**Int. Cl. H01q** *15/14*

**U.S. Cl. 343—18 B** **12 Claims**




The invention is for a tuned resonant surface utilizing an array of short, loaded dipoles to obtain unity reflection or transmission coefficient over a narrow bandwidth about the desired frequency with said coefficient substantially independent of the angle of incidence of the impinging or radiated electromagnetic signal. Reference is made to the claims for a legal definition of the invention.

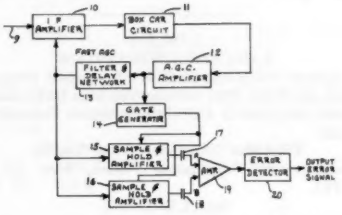
## 3,789,405
## AUTOMATIC STEP ELIMINATOR CIRCUIT TO PREVENT RADAR JAMMING

**Alan H. Nielsen, Pompton Plains, N.J., assignor to The United States of America as represented by the Secretary of the United States Air Force, Washington, D.C.**

**Filed Mar. 29, 1972, Ser. No. 238,706**

**Int. Cl. G01s** *7/36, 9/02*

**U.S. Cl. 343—18 E** **3 Claims**




An automatic step eliminator circuit to prevent radar jamming is provided wherein the voltage applied to the AGC input of one IF amplifier of a tracking radar is sampled in two parallel sample and hold amplifiers which are instructed by a signal developed by the onset of jamming so that the normal target signal is stored in one channel and the electronic countermeasure (ECM) signal in another. The outputs of both channels are added to develop continuous error signals. The error detector of the tracking radar then receives signals recovered from both jamming and target during alternate intervals and therefor continuously.

## 3,789,406
## APPARATUS FOR SIMULTANEOUSLY TRANSMITTING AND RECEIVING AS WELL AS MIXING TRANSMITTED AND RECEIVED WAVES

**Hans Wernli, Wettswil, Switzerland, assignor to Siemens-Albis Aktiengesellschaft, Zurich, Switzerland**

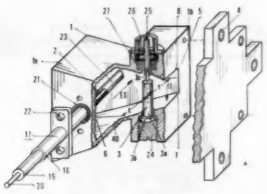
**Continuation of Ser. No. 856,269, Sept. 9, 1969, abandoned. This application Dec. 27, 1971, Ser. No. 212,571**

**Claims priority, application Switzerland, Sept. 25, 1965, 14348/65**

**Int. Cl. H04b** *7/00*; **H01q** *13/00*

**U.S. Cl. 343—100 R** **7 Claims**

An apparatus for simultaneously transmitting and receiving as well as mixing transmitted and received waves. The transmitted and received waves respectively having perpendicular polarization directions with respect to one another. The apparatus comprises a reflector with an associated primary horn radiator impinging upon the reflector. The primary horn radiator is advantageously flared throughout its length from front to back thereof to provide a tapered hollow space therein. An excitation conductor delivers the waves to be transmitted to the horn radiator. There is provided means for receiving waves captured by the radiator, such receiving means being arranged in the tapered hollow space of the horn radiator and serves to filter out and remove the received waves as well as a portion of the transmitted waves and to mix these filtered out waves. For the purpose of compensating for non-symmetry in the field of the received wave the receiving means is advantageously arranged in offset relationship with respect to the central lengthwise axis of the horn radiator. Such apparatus has typical utilization in electronic distance measuring environments.



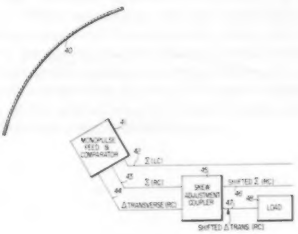
## 3,789,407
## METHOD AND APPARATUS FOR CONTROLLING BEAM SKEW

**Jack Rosa, Melbourne Beach, and Homer E. Bartlett, Melbourne, both of Fla., assignors to Harris-Intertype Corporation, Cleveland, Ohio**

**Filed Feb. 28, 1972, Ser. No. 230,012**

**Int. Cl. G01s** *7/36*

**U.S. Cl. 343—100 PE** **10 Claims**

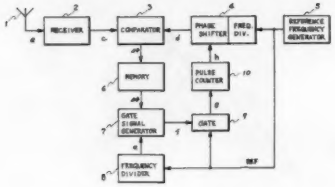



A method and apparatus for correcting radiated beam skew in a circularly polarized offset fed parabolic reflector antenna by the introduction of a difference pattern of one direction of circular polarization in the transverse plane, and adding it to the sum pattern of a corresponding direction of circular polarization to move the sum pattern to the position of the skewed sum pattern of the other direction of circular polarization. Mechanical means are used to boresight the two superimposed patterns.

## 3,789,408
## SYNCHRONOUS SYSTEM

Koji Ichihara, Neyagawa; Hideki Tanaka, Takatsuki; Kazutaka Ishida, Suita, and Minoru Handa, Nishinomiya, all of Japan, assignors to Furuno Electric Company, Limited, Nagasaki-ken, Japan

Filed May 15, 1972, Ser. No. 253,000
Claims priority, application Japan, May 27, 1971, 46/36836
Int. Cl. G01s 1/30
U.S. Cl. 343—105 R 4 Claims

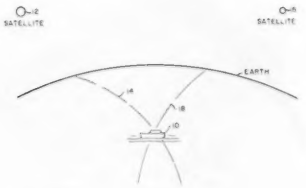



Means for measuring time or phase differences between incoming segmented signals which includes the generation of a segmented reference signal having the same frequency of the incoming signals. A comparator for comparing the phase difference between an incoming signal and the reference signal and means for storing the detected phase difference. Means for producing a control pulse train for dividing said phase difference into n parts where n is the number of segments used for detecting said phase difference and then shifting the phase of each segment of the reference signal by $1/n$ for each pulse of the control pulse train.

## 3,789,409
## NAVIGATION SYSTEM USING SATELLITES AND PASSIVE RANGING TECHNIQUES

Roger L. Easton, 7704 Oxon Hill Rd., Oxon Hill, Md.

Filed Oct. 8, 1970, Ser. No. 79,307
Int. Cl. G01s 5/14, 11/00
U.S. Cl. 343—112 R 6 Claims

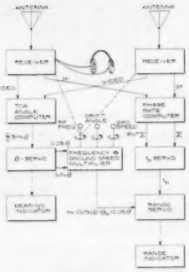



A navigation system wherein the navigator's location is obtained by determining the navigator's distance (or range) from one or more satellites of known location. Each satellite transmits multifrequency signals that are derived from a stable oscillator which is phase synchronized with the navigator's equipment that produces similar multifrequency signals. Phase comparison between the signals received from the satellites and the locally produced signals indicates both the distance between the navigator and the satellites and the navigator's location. In determining his location, the presence of the navigator is not revealed since no interrogatory transmission by him is required.

## 3,789,410
## PASSIVE RANGING TECHNIQUE

Lloyd M. Smith, Canoga Park, and Kanji Frank Sayano, Sepulveda, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 7, 1972, Ser. No. 216,300
Int. Cl. G01s 5/14
U.S. Cl. 343—112 D 5 Claims

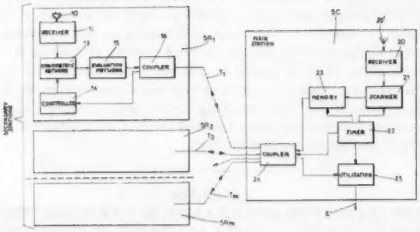



A system for passively determining range to a threat emitter from a single tactical vehicle based upon the change in the difference of phase of a radio frequency carrier between two physically spaced antennas.

## 3,789,411
## RADIOLOCATION SYSTEM

Roger Bataille, Bures/Morainvilliers; Francois P. Maison, Eaubonne, and Pierre Paul Curvale, Verrieres-Le-Buisson, all of France, assignors to Electronique Marcel Dassault, Paris, France

Filed Mar. 25, 1968, Ser. No. 716,704
Claims priority, application France, Mar. 24, 1967, 67100193
Int. Cl. G01s 3/72
U.S. Cl. 343—113 R 20 Claims



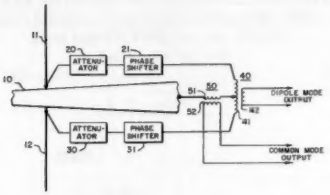

To determine the locations of extraneous sources of radio waves, a central station omnidirectionally monitors a band of frequencies and, upon detecting a radio signal within such band, transmits information of its frequency to a plurality of peripheral stations which thereupon radiogoniometrically ascertain the angle of incidence of the signal having this frequency and relay the magnitude of this angle to the central station.

3,789,412

## AIRCRAFT ANTENNA BALANCE TECHNIQUES

Michael G. Keenan, Redwood City; William M. Lynch, Palo Alto, and John H. Priedigkeit, Menlo Park, all of Calif., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Oct. 17, 1968, Ser. No. 768,978
Int. Cl. G01s 3/10
U.S. Cl. 343—114 4 Claims



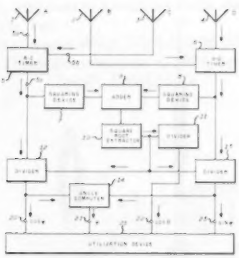

Antenna balance and coupling circuitry for providing rejection of radio frequency signals produced by airframe currents flowing in a vertically polarized dipole antenna installed on an airborne structure.

3,789,413

## RADIO NAVIGATION SYSTEM

Gerald F. Ross, Lexington, Mass., and Robert S. Jacobson, Phoenix, Ariz., assignors to Sperry Rand Corporation, New York, N.Y.

Filed June 12, 1972, Ser. No. 261,834
Int. Cl. G01s 5/02; H03b 3/04
U.S. Cl. 343—113 R 9 Claims



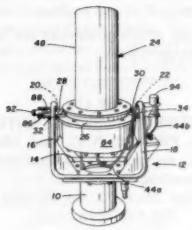
The radio navigation system provides simple instrumentation for transmitting omnidirectional radio waves from a reference location and for determining the azimuth and elevation angles of arrival of the transmitted waves at a remote receiver. An array of paired receiver antennas is employed for the measurement of differences in time of arrival of the transmitted waves at the paired antennas and these values are manipulated by a simple analog computer to yield the desired azimuth and elevation data.

3,789,414

## PENDULUM STABILIZATION FOR ANTENNA STRUCTURE WITH PADOME

George B. Bauer, Reston, Va., and Dean S. Thornberg, Salt Lake City, Utah, assignors to E-Systems Inc., Dallas, Tex., by said Thornberg

Filed July 19, 1972, Ser. No. 273,304
Claims priority, application France, Sept. 29, 1971, 7127812
Int. Cl. H01q 3/12, 1/42
U.S. Cl. 343—761 9 Claims




Tactical radio navigation systems provide bearing, distance and identification determining signals generated by a reply transmitter as emitted from an antenna structure. Antenna structures mounted on movable platforms, such as a ship's mast, must be position stabilized to provide maximum power to the bearing and distance signals above the horizon. To stabilize the antenna structure, a supporting yoke mounts to the movable platform. This yoke supports bearings aligned along an axis to provide stabilization in a given direction. Mounted to these bearings are journals extending from the mounting plate of an antenna pedestal. The plate supports the central array of the antenna structure and has a spin motor attached to the underside thereof. This spin motor acts like a pendulum to stabilize the pedestal with reference to the horizon around the desired stabilization direction. Mounted to the output shaft of the spin motor are parasitic elements which rotate around the antenna structure to provide a modulation frequency. When two degrees of stabilization are required, a gimbal ring mounts to the supporting yoke and the pedestal mounts to the gimbal ring. In systems where multiple degrees of stabilization are required, bearings of the yoke are aligned along an axis in the first direction of desired stabilization and bearings of the gimbal ring are aligned along an axis in the second direction of desired stabilization.

3,789,415

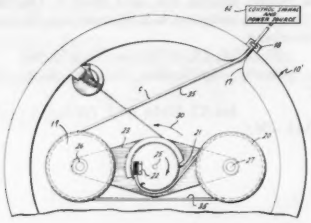
## APPARATUS FOR WRAPPING CABLES OR THE LIKE AND A ROTATABLE ANTENNA UTILIZING THE SAME

Jack M. Vickland, Palo Alto, Calif., assignor to Philco-Ford Corporation, Blue Bell, Pa.

Filed Dec. 26, 1972, Ser. No. 318,265
Int. Cl. H01q 3/04
U.S. Cl. 343—763 12 Claims

Apparatus for wrapping cables, hoses or the like, leading from fixed structure to a rotatable element such as a mechanical scanning antenna, said apparatus accommodating multiturn rotation of the antenna without subjection of the cables

or hoses to substantial torsional forces. A planetary cable winding and guiding carrier is used, in association with a main



cable-receiving drum which comprises the sun element of a planetary cable take-up system.

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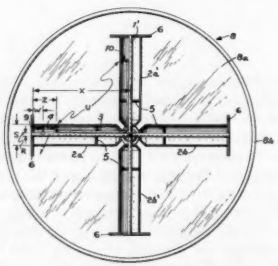
3,789,416

## SHORTENED TURNSTILE ANTENNA

John A. Kuecken, Pittsford, N.Y., and Michael S. Polgar, Ocean Port, N.J., assignors to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed Apr. 20, 1972, Ser. No. 246,050
Int. Cl. H01q 21/26
U.S. Cl. 343—792 15 Claims



An electrically short turnstile type antenna array which effectively provides vertical or overhead right or left hand circularly polarized coverage in for example satellite communications from a very restricted space volume as characterized particularly in submarine or aircraft antennas. A pair of electrically short dipoles are arranged normal to each other with the axes thereof intersecting at their mid-points. Coaxially arranged about each leg of these dipoles is an open-ended cylindrical sleeve. The feed to the array is by way of a coaxial cable running to the inside of the coaxial cavity formed by one of the sleeves in an end-feed orientation. A mutual coupling link couples signal energy from the inside of the fed coaxial cavity to the inside of one of the coaxial cavities associated with the other dipole. The entire array is mounted on a support mast less than one-eighth λ from the horizontal base portion of a tin can-shaped ground plane whose vertical sides are sufficiently high to substantially house the array.

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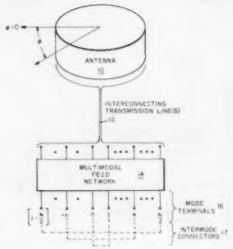
3,789,417

## CIRCULARLY SYMMETRIC RETRODIRECTIVE ANTENNA

H. Paris Coleman, Alexandria, Va., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 25, 1972, Ser. No. 220,663
Int. Cl. H01Q 3/26
U.S. Cl. 343—816 15 Claims

A method and apparatus for obtaining automatic retrodirective performance from circularly symmetric arrays, and circular continuous aperture antennas. Phased mode sets are provided by a multimodal feed network as a result of modal interconnection methods. All modes in a particular mode set become in phase in the direction of an incoming signal, and as a result, a beam is made to reradiate in that




direction. The method is applicable to two and three-dimensional retrodirective systems and includes both active and passive devices. Also, the reradiated beam width, beam power, and other reradiated beam characteristics including sidelobe functions, are capable of being controlled and adjusted.

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3,789,418

## FLEXIBLE ANTENNA FORMED OF OPPOSED CONVEX LAMINATED STRIPS COVERED WITH A HEAT-SHRUNK HOSE

Helmut Reiber, Bauschlott, and Rolf Stapelfeldt, Pforzheim, both of Germany, assignors to International Standard Electric Corporation, New York, N.Y.

Filed Oct. 25, 1972, Ser. No. 300,621
Claims priority, application Germany, Nov. 3, 1971, P 21 54 651
Int. Cl. H01q 9/30
U.S. Cl. 343—872 9 Claims

This invention relates to a laminated antenna for portable radio sets which can be bent or buckled. The antenna lamination consists of two longitudinally staggered groups of transversely cambered steel strips. These strip groups are so disposed in a mirror-inverted arrangement that a biconvex

cross section is obtained. Firmly interconnected only at the base of the antenna through a holder, the entire arrangement is covered with a heat-shrunk hose. The biconvex arrangement of the steel strips results in a rigidity equal in both directions of bending. The covering provides protection against atmospheric influences, contamination and injuries and prevents reflections of light.

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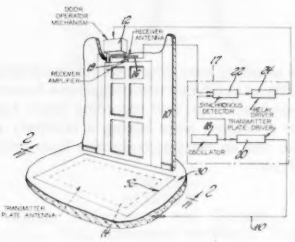
**3,789,419**

## PLATE ANTENNA WITH PROTECTIVE COVER

**Frederick C. Schultz, 15448 Rudland, Roseville, Mich.**

**Filed July 17, 1972, Ser. No. 272,337**
**Int. Cl. H01q** *1/40*
**U.S. Cl. 343—873** **3 Claims**



A plate antenna as used, for example, in combination with a proximity door operator system has a capacitive signal plate situated between two shielding panels of fiber glass and cemented to such panels to form a unitary structure which, in turn, is placed below floor level so that anyone passing thereover increases the relative capacitive coupling necessary for related door actuation.

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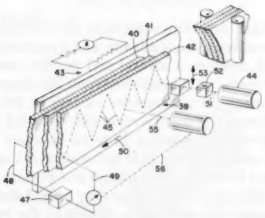
**3,789,420**

## WIDE BAND RECORDING APPARATUS

**Richard N. Claytor, Arlington, and Dayton D. Eden, Dallas, both of Tex., assignors to Advanced Technology Center, Inc., Grand Prairie, Tex.**

**Continuation-in-part of Ser. No. 825,855, May 19, 1969, abandoned. This application Feb. 2, 1971, Ser. No. 112,012**
**Int. Cl. G01d** *15/34*
**U.S. Cl. 346—1** **6 Claims**



Disclosed is a wide bandwidth recording medium including a thermochromic material which changes reflectance with temperature. Information is recorded on the recording medium by selectively varying temperatures of discrete portions of the thermochromic material with a modulated energy beam such as a laser beam or electron beam. Techniques are described which permit extremely high resolution of data bits to be obtained in the recording medium even though the recording process is a thermal one. Apparatus is also disclosed for erasably and permanently recording information on thermochromic films.

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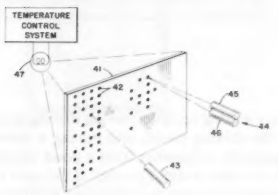
**3,789,421**

## BINARY LOGIC APPARATUS

**Jay S. Chivian, 919 Warfield Way, Richardson, Tex.; Richard N. Claytor, 3306 Woodford Dr., Arlington, Tex., and Dayton D. Eden, 6827 Meadow Creek, Dallas, Tex.**

**Continuation-in-part of Ser. No. 825,677, May 19, 1969, abandoned. This application Feb. 2, 1971, Ser. No. 112,013**
**Int. Cl. G01d** *15/34*
**U.S. Cl. 346—1** **8 Claims**




Disclosed are apparatus for recording information in binary form on thermochromic recording media, apparatus for optically and electronically interrogating such recording media, and systems utilizing thermochromic materials for processing data in binary form.

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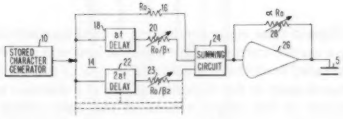
**3,789,422**

## INK DROP COUPLING CAPACITANCE COMPENSATION

**John W. Haskell, Endwell, and Sherman H. M. Tsao, Apalachin, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Sept. 21, 1972, Ser. No. 291,124**
**Int. Cl. G01d** *18/00*
**U.S. Cl. 346—75** **10 Claims**



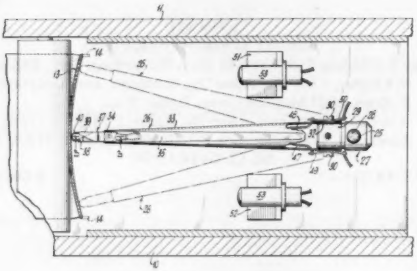

A character generator is connected to the charging electrode of an ink jet printer nozzle through a compensating circuit which modulates the charging voltage applied to each individual ink drop in accordance with the charges on one or more preceding drops in order to compensate for the capacitance effect of the preceding drops on said one individual drop.

3,789,423

## DIRECT WRITING RECORDER INCLUDING AN IMPROVED STYLUS ASSEMBLY THEREFOR

Howard Fawcett, Briarcliff Manor, N.Y., assignor to Cambridge Instrument Company, Inc., Ossining, N.Y.

Filed Dec. 6, 1971, Ser. No. 205,027
Int. Cl. G01d 15/10
U.S. Cl. 346—76 R 16 Claims



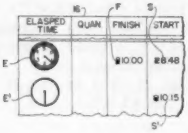
A direct writing recorder having driving means, an arm carried by the driving means and having a cross-sectional area which gradually diminishes from a point adjoining the driving means to its apex, a stylus carried at the apex of the arm and a curved platen carrying the recording medium over which the stylus moves in recording electrical signals.

3,789,424

## ELAPSED TIME RECORDER

Vincent Majorino, 1668 Byam Rd., Waterbury, Conn.

Filed Nov. 17, 1971, Ser. No. 199,559
Int. Cl. G07c 1/02
U.S. Cl. 346—95 12 Claims



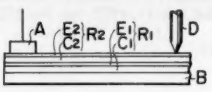

An elapsed time recorder having a card receiver for supporting a record card in a first position and in a second position displaced from the first position. A pair of rotable printing dies spaced apart in the direction of and at a distance substantially equal to the displacement of the card rotate in accordance with passage of time. The face of one of the dies has an annular series of time graduations thereon, whereas the other die face bears a reference mark. Means is provided to bring at least one of the die faces into printing engagement with the card in its first position and at least the other of the die faces into printing engagement with the card in its second position so that the resulting imprints on the card are in overlapping registry with each other. The elapsed time interval between dies may be read directly from the resulting composite imprint on the card. The recorder also includes means for recording the time at the beginning and end of the interval.

3,789,425

## ELECTRO-SENSITIVE RECORDING MEDIUM HAVING A PLURALITY OF RECORDING LAYERS

Hiromi Matsushima, Tokyo, Japan, assignor to Colorfax Company Limited, Tokyo-to, Japan

Filed June 9, 1972, Ser. No. 261,392
Claims priority, application Japan, June 13, 1971, 46/41837; Aug. 4, 1971, 46/58820; Dec. 7, 1971, 46/98303
Int. Cl. G01d 15/34
U.S. Cl. 346—135 10 Claims



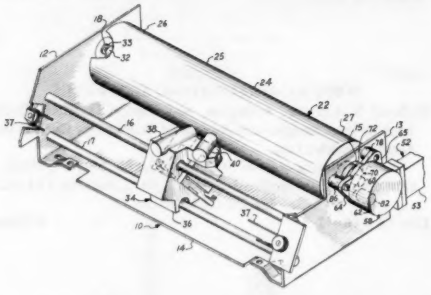

An electro-sensitive recording medium comprising a base layer, a plurality of laminated recording layers formed on one surface of said base layer, said recording layers each being comprised of a colored layer having a relatively great resistance value and an electro-conductive layer provided on this colored layer.

3,789,426

## FACSIMILE DRIVE APPARATUS

Jan M. Farlow, Fort Wayne, Ind., assignor to Minnesota Mining and Manufacturing Company

Filed Dec. 29, 1972, Ser. No. 319,341
Int. Cl. G01d 15/24
U.S. Cl. 346—138 8 Claims



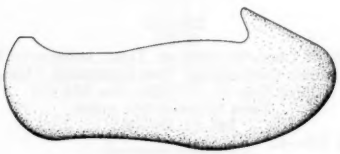
The disclosure describes apparatus for reducing jitter in a facsimile system comprising a frame and a rotatable drum having a first end portion, a second end portion and an axis of rotation. A transducer is positioned near the drum in order to produce an image on a document carried by the drum. The first end portion of the drum is rotatably mounted to the frame through a self-aligning bearing. In order to rotate the drum, a DC motor is used to drive a gear reducing unit that is substantially free from backlash. The second end portion of the drum is coupled to the gear reducing unit by a rigid shaft. Resilient members support the shaft with respect to the frame so that any energy due to a component of movement of the shaft in a direction perpendicular to the axis of rotation is absorbed. A spring biases the transducer toward the drum so that the transducer can follow any eccentric movement of the drum due to alignment errors.

# DESIGNS

JANUARY 29, 1974

**230,103**
**PROTECTIVE SPORTS HELMET**
Harmey S. Hyatt, Jr., General Delivery, Albemarle, N.C. 28001
Filed Mar. 6, 1972, Ser. No. 232,346
Term of patent 14 years
Int. Cl. D2—*03*
U.S. Cl. D2—232

**230,104**
**SLIPPER**
Ray E. Larsh, Milwaukee, and Donald I. Urbansky, Thiensville, Wis., assignors to Kleen Test Products, Inc., Milwaukee, Wis.
Filed Oct. 26, 1971, Ser. No. 192,169
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—301



**230,105**
**HAIR BRUSH AND COMB COMBINATION**
Martin Newman, 1203 N. Sweetzer 90060, and Alvin L. Frankel, 6038 W. 75th St. 90045, both of Los Angeles, Calif.
Filed Dec. 13, 1972, Ser. No. 314,836
Term of patent 14 years
Int. Cl. D4—*02*
U.S. Cl. D4—21

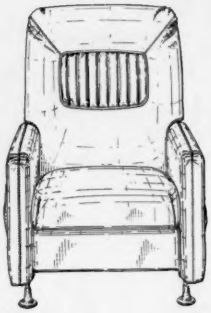
**230,106**
**CRIB END**
Robert V. Jacobs, Los Angeles, Calif., assignor to Questor Corporation, Toledo, Ohio
Filed Aug. 25, 1972, Ser. No. 283,835
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—14

**230,107**
**CRIB END**
Robert V. Jacobs, Los Angeles, Calif., assignor to Questor Corporation, Toledo, Ohio
Filed Aug. 25, 1972, Ser. No. 283,836
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—14

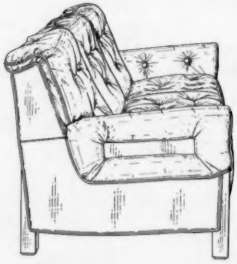
230,108
DISPLAY STAND
James L. Sloan, Rochester, N.Y., assignor to Cross River Products, Inc., Croton-on-Hudson, N.Y.
Filed Sept. 1, 1972, Ser. No. 285,731
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—27

230,109
SUPPORT STAND FOR A HANGING SEAT OR SIMILAR ARTICLE
Phillip A. Gass, 241 S. 89th St., Omaha, Nebr. 68114
Filed Apr. 7, 1972, Ser. No. 242,297
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—29

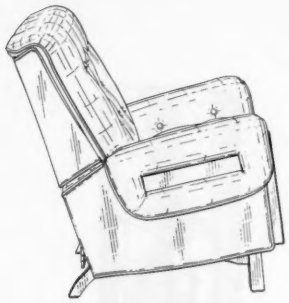
230,110
CHAIR
Stapleton Long, Morristown, Tenn., assignor to The Berkline Corporation, West Springfield, Mass.
Filed Aug. 30, 1972, Ser. No. 284,940
Term of patent 3½ years
Int. Cl. D6—*01*
U.S. Cl. D6—39



230,111
SOFA
Stapleton Long, Morristown, Tenn., assignor to The Berkline Corporation, West Springfield, Mass.
Filed Aug. 30, 1972, Ser. No. 284,933
Term of patent 3½ years
Int. Cl. D6—*01*
U.S. Cl. D6—63

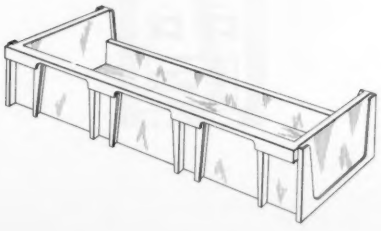


230,112
CHAIR
Stapleton Long, Morristown, Tenn., assignor to The Berkline Corporation, West Springfield, Mass.
Filed Aug. 30, 1972, Ser. No. 284,938
Term of patent 3½ years
Int. Cl. D6—*01*
U.S. Cl. D6—71

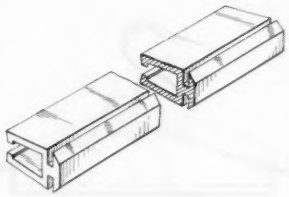


230,113
APPAREL HANGER
David H. Lindemann, 228 SW. 21st Terrace, Fort Lauderdale, Fla. 33312
Filed Aug. 23, 1972, Ser. No. 283,046
Term of patent 14 years
Int. Cl. D6—*08*
U.S. Cl. D6—116

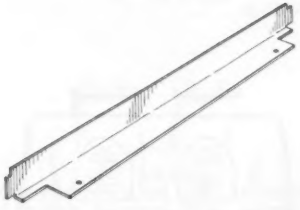
230,114
EXTENSION TRAY FOR A SHELF
Robert Jennee, Upper Saddle River, N.J., assignor to Electronic Assistance Corporation, Fair Lawn, N.J.
Filed Mar. 10, 1972, Ser. No. 233,867
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—181



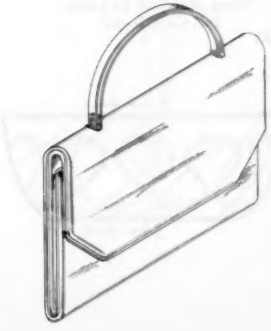
230,115
END CONNECTOR BRACKET FOR SHELVING OR OTHER ARTICLES
Anthony George Beams, London, England, assignor to E. & H. Grace Limited, London, England
Filed Mar. 23, 1972, Ser. No. 237,603
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—191



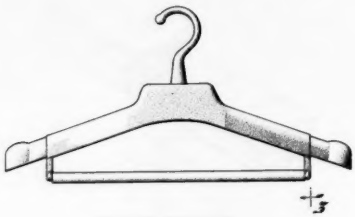
230,116
END SUPPORT FOR HORIZONTAL SHELVING AND OTHER ARTICLES OF FURNITURE
Anthony George Beams, London, England, assignor to E. & H. Grace Limited, London, England
Filed Mar. 23, 1972, Ser. No. 237,604
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—191



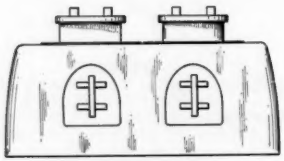
230,117
PORTABLE MAT
Andrew Johnson, 3140 N. 12th St., Philadelphia, Pa. 19133
Filed Apr. 30, 1971, Ser. No. 139,318
Term of patent 14 years
Int. Cl. D6—*09*
U.S. Cl. D6—201



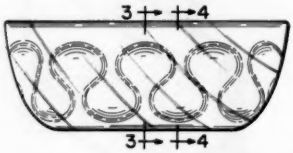
**230,118**
**ADJUSTABLE CLOTHES HANGER**
Donald D. Geisler, 12905 N. Miami Ave., Miami, Fla. 33168
Filed Mar. 12, 1973, Ser. No. 340,029
Term of patent 14 years
Int. Cl. D6—*08*
U.S. Cl. D6—249



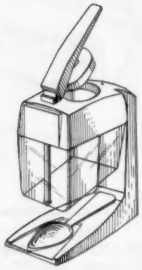
**230,119**
**GRILL**
James T. Sakata, 653 20th Ave., San Francisco, Calif. 94121
Filed Aug. 4, 1971, Ser. No. 169,154
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—11 D



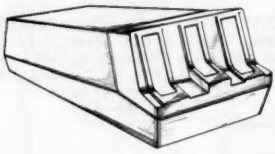
**230,120**
**CASSEROLE**
Glenn B. Beckman, Corning, N.Y., assignor to Corning Glass Works, Corning, N.Y.
Filed Mar. 1, 1972, Ser. No. 231,059
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—28




**230,121**
**DISPENSER FOR CONDIMENTS OR THE LIKE**
John W. Downey, Warren, Pa., assignor to Whirley Industries, Inc., Warren, Pa.
Filed Jan. 3, 1972, Ser. No. 215,277
Term of patent 14 years
Int. Cl. D7—*06*
U.S. Cl. D7—52

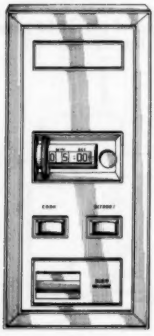


**230,122**
**SCABBARD**
Peter K. Bayly, Greensborough, Victoria, Australia, assignor to Wiltshire Cutlery Company Proprietary Limited, South Melbourne, Victoria, Australia
Filed Apr. 3, 1972, Ser. No. 240,899
Claims priority, application Australia Oct. 1, 1971
Term of patent 14 years
Int. Cl. D7—*06*
U.S. Cl. D7—74



230,123
MICROWAVE OVEN CONTROL PANEL
Arthur Franklin Ludvigsen, Burnsville, Minn., assignor to Litton Systems, Inc., Beverly Hills, Calif.
Filed Mar. 1, 1973, Ser. No. 336,965
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—135

230,124
MICROWAVE OVEN CONTROL PANEL
Arthur Franklin Ludvigsen, Burnsville, Minn., assignor to Litton Systems, Inc., Beverly Hills, Calif.
Filed Mar. 1, 1973, Ser. No. 337,018
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—135



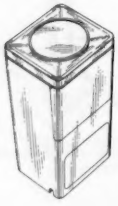
230,125
KNIFE
Donald Wallance, Croton-on-Hudson, N.Y., assignor to H. E. Lauffer Co., Inc., Somerset, N.J.
Filed July 25, 1972, Ser. No. 274,920
Term of patent 14 years
Int. Cl. D7—*03*
U.S. Cl. D7—137

230,126
KNIFE HANDLE OR SIMILAR ARTICLE
Ross F. Pollard, Amesbury, Mass., assignor to Towle Manufacturing Company, Newburyport, Mass.
Filed Sept. 5, 1972, Ser. No. 286,022
Term of patent 14 years
Int. Cl. D7—*03*
U.S. Cl. D7—150

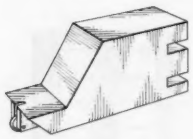
**230,127**
**WEEDER**
Joseph P. Banner, 2550 N. Venice, Tucson, Ariz. 85712
Filed Dec. 27, 1971, Ser. No. 212,840
Term of patent 14 years
Int. Cl. D8—*03*
U.S. Cl. D8—11

**230,128**
**SNOWMOBILE TOOL**
Howard A. Fistler, Utica, and Richard A. Hollingsworth, Mount Clemens, Mich., assignors to HFCO, Mount Clemens, Mich.
Filed Feb. 28, 1972, Ser. No. 230,202
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—26

**230,129**
**HOUSING FOR AN ELECTRIC CAN OPENER**
Brian Scott Smith, High Wycombe, England, assignor to Tower Housewares Limited, Staffordshire, England
Filed Nov. 15, 1972, Ser. No. 306,807
Claims priority, application Great Britain Aug. 25, 1972
Term of patent 14 years
Int. Cl. D7—*99*
U.S. Cl. D8—36

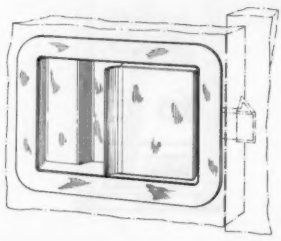


**230,130**
**FREEHAND GLASS CUTTER**
Frank Greaves, 20 Shadwick Drive, Weston, Ontario, Canada
Filed Mar. 16, 1972, Ser. No. 235,466
Term of patent 14 years
Int. Cl. D8—*03*
U.S. Cl. D8—51



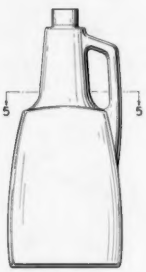
**230,131**
**NAIL HOLDER**
Walter W. Levinson, 101 Conshohocken State Road, Bala-Cynwyd, Pa. 19004
Filed Mar. 1, 1972, Ser. No. 231,056
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—71

**230,132**
**PADDLE HANDLE RECESSED LOCK**
John V. Pastva, Jr., Parma Heights, Ohio, assignor to The Eastern Company, Cleveland, Ohio
Filed Dec. 20, 1971, Ser. No. 210,311
Term of patent 14 years
Int. Cl. D8—*06*
U.S. Cl. D8—109



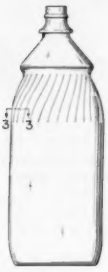
**230,133**
**BOTTLE**
Richard L. Weckman, Perrysburg, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio
Filed May 24, 1972, Ser. No. 256,627
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—1

**230,134**
**BOTTLE**
Edward J. Kretz, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio
Filed June 22, 1972, Ser. No. 265,207
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—48



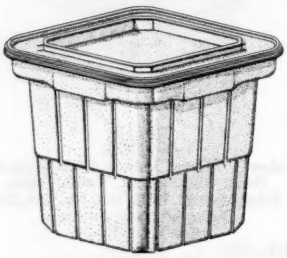
**230,135**
**DISPENSING CONTAINER FOR LIQUIDS**
Louis V. Nigro, Saugus, Mass., assignor to The Gillette Company, Boston, Mass.
Filed Apr. 24, 1972, Ser. No. 247,246
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—71

**230,136**
**BOTTLE**
Gordon A. Strand, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio
Filed May 30, 1972, Ser. No. 258,228
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—158



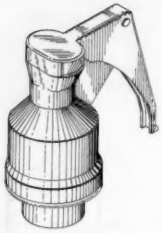
**230,137**
**CONTAINER FOR COSMETICS OR THE LIKE**
Franco Bettonica, Milan, Italy, assignor to Perlier S.p.A., Milan, Italy
Filed May 30, 1972, Ser. No. 258,196
Claims priority, application Italy Jan. 17, 1972
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—168

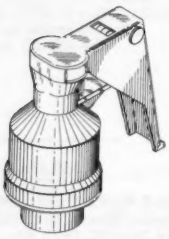
**230,138**
**PACKAGING CONTAINER FOR FOOD OR THE LIKE**
**Paul A. Weller, Waukegan, Ill.**
**(Rte. 1, Box 66A, Union Grove, Wis. 53182)**
**Filed Feb. 9, 1972, Ser. No. 225,029**
**Term of patent 14 years**
**Int. Cl. D9—*03***
**U.S. Cl. D9—219**



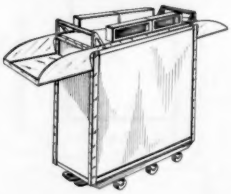
**230,139**
**MULTIFUNCTION UTILITY CAP**
**Philip D. Bart, Monsey, N.Y.**
**(30–70 NE. 43rd St., Fort Lauderdale, Fla. 33306)**
**Filed Jan. 26, 1972, Ser. No. 221,121**
**Term of patent 14 years**
**Int. Cl. D9—*07***
**U.S. Cl. D9—254**

**230,140**
**DISPENSING CAP**
**Lloyd J. Schimke, Box 1272, Highway 2 E., Minot, N. Dak. 58701**
**Filed Oct. 12, 1972, Ser. No. 297,156**
**Term of patent 14 years**
**Int. Cl. D9—*07***
**U.S. Cl. D9—278**



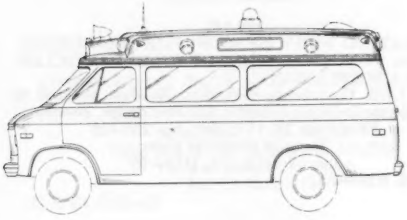


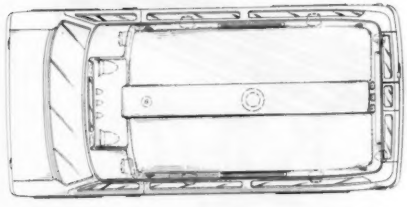
**230,141**
**SERVICE CART**
**Matthew N. Miller, Woodland Hills, Calif., assignor to Fairchild Industries, Inc., Germantown, Md.**
**Filed Mar. 8, 1973, Ser. No. 339,135**
**Term of patent 14 years**
**Int. Cl. D12—*02***
**U.S. Cl. D12—29**



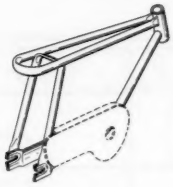
230,142
LUGGAGE CART WITH CHILD SEAT
James M. Muellner, 1777 Stillwater St., White Bear Lake, Minn. 55110
Filed Feb. 2, 1972, Ser. No. 223,059
Term of patent 14 years
Int. Cl. D12—*02*
U.S. Cl. D12—22

230,143
AMBULANCE BODY
Donald H. Cox, Lima, Ohio, assignor to Sheller-Globe Corporation, Toledo, Ohio
Filed Oct. 27, 1971, Ser. No. 193,239
Term of patent 14 years
Int. Cl. D12—*08*
U.S. Cl. D12—99



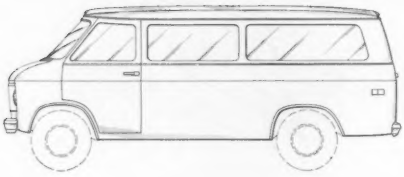


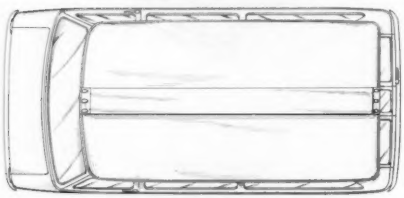
230,144
BICYCLE FRAME
Charles L. Voytko, % Hedstrom Co., Bedford, Pa. 15522
Filed Apr. 13, 1973, Ser. No. 350,778
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D12—111



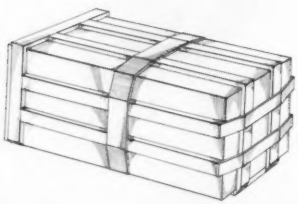
230,145
BICYCLE STAND
Randall N. Johnson, 5947 Poplar St., Commerce City, Colo. 80022
Filed Aug. 23, 1972, Ser. No. 283,223
Term of patent 14 years
Int. Cl. D8—*99*; D12—*11*
U.S. Cl. D12—115

**230,146**
**VAN BODY**
**Donald H. Cox, Lima, Ohio, assignor to Sheller-Globe Corporation, Toledo, Ohio**
**Filed Sept. 13, 1971, Ser. No. 180,241**
**Term of patent 14 years**
**Int. Cl. D12—*08***
**U.S. Cl. D14—3 J**

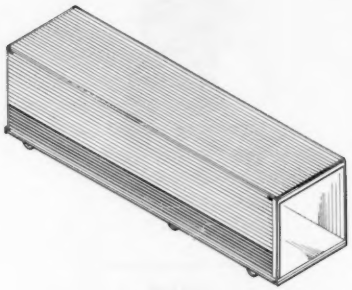




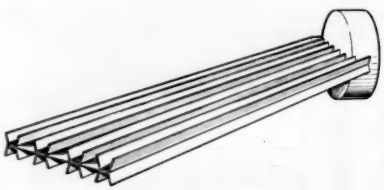
**230,147**
**TRANSPORTABLE REFUSE CONTAINER**
**Samuel Vincen Bowles, 15680 High Knoll Road, Encino, Calif. 91316**
**Filed Dec. 9, 1971, Ser. No. 206,592**
**Term of patent 14 years**
**Int. Cl. D9—*03***
**U.S. Cl. D14—3 R**



**230,148**
**CARGO TRAILER**
**L. Ray Wood, 501 Circle Drive, Arlington, Tex. 76011**
**Filed Nov. 1, 1972, Ser. No. 302,945**
**Term of patent 7 years**
**Int. Cl. D12—*10***
**U.S. Cl. D14—3 E**

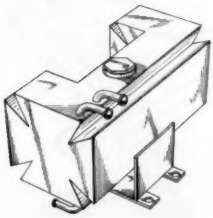


**230,149**
**VIBRATING BODY (SENSOR) FOR MEASURING THE CONCENTRATION OF SOLID PARTICLES IN A SUSPENSION**
**Berth Ulrik Gustafsson, Osterskar, Sweden, assignor to Projectus Industriprodukter AB, Stockholm, Sweden**
**Filed Mar. 29, 1972, Ser. No. 239,415**
**Term of patent 14 years**
**Int. Cl. D24—*99*; D10—*99***
**U.S. Cl. D16—2 C**



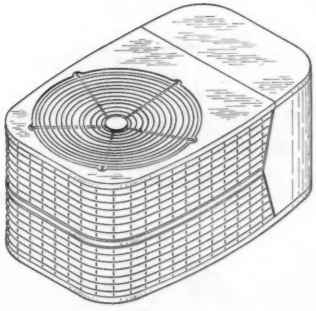
230,150
POLICE CLUB OR SIMILAR ARTICLE
Lon Richard Anderson, Central City, Iowa, assignor to Monadnock Lifetime Products, Inc., Fitzwilliam N.H.
Filed May 17, 1972, Ser. No. 254,346
Term of patent 14 years
Int. Cl. D22—*02*
U.S. Cl. D22—1

230,151
COMBINED OIL TANK AND MOUNTING MEANS FOR A MOTORCYCLE
Jerry F. Morris, 220 S. Roselle Road, Schaumburg, Ill. 60172
Filed Dec. 27, 1972, Ser. No. 318,726
Term of patent 3½ years
Int. Cl. D12—*11*
U.S. Cl. D23—2



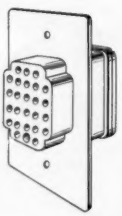
230,152
EAVES TROUGH CLEANING DEVICE
Albert R. Froehlke, 742 33rd St., South Bend, Ind. 46615
Filed Dec. 29, 1971, Ser. No. 213,784
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—34

230,153
CASING FOR REFRIGERATION SYSTEM CONDENSING UNITS OR THE LIKE
Walter W. Hoyle, Fayetteville, and Curtis L. Tobin, Chittenango, N.Y., assignors to Carrier Corporation, Syracuse, N.Y.
Filed Dec. 2, 1971, Ser. No. 204,403
Term of patent 3½ years
Int. Cl. D23—*04*
U.S. Cl. D23—139

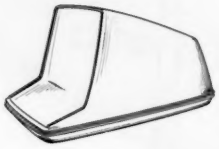


230,154
SYRINGE
Lawrence Emmerson House II, Baltimore, Md., assignor to Litton Medical Products, Inc., Elk Grove Village, Ill.
Filed Mar. 8, 1973, Ser. No. 339,222
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D24—1 D

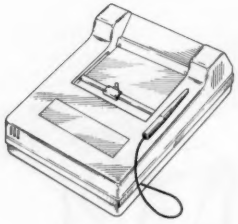
230,155
COMBINED CONDUCTOR JACK AND PLUG ASSEMBLY
Richard E. Brown, Gahanna, Ohio, assignor to Twyco, Inc., Blacklick, Ohio
Filed Aug. 5, 1971, Ser. No. 169,592
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D26—1 A



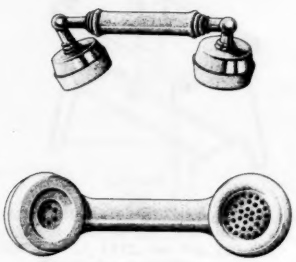
230,156
DATA TERMINAL HOUSING
Donald A. Pahl, Los Altos, and Paul E. Rasmussen, Sunnyvale, Calif., assignors to Vydes, Inc., Whippany, N.J.
Continuation of design application Ser. No. 127,078, Mar. 22, 1971. This application Nov. 1, 1972, Ser. No. 302,684
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D26—5 C



230,157
CABINET FOR HOUSING APPARATUS PERMITTING THE TRANSMISSION AND RECEPTION OF WRITTEN MATERIAL BY TELEPHONE
James L. Rodgers, Tempe, and Joseph L. Tyrrell, Phoenix, Ariz., assignors to Talos Systems, Inc.,
Filed Oct. 18, 1971, Ser. No. 190,434
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D26—14 R

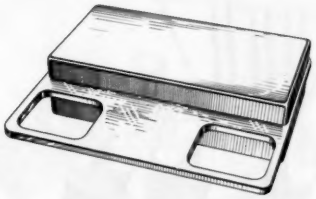


230,158
TELEPHONE HANDSET
Donald Michael Genaro, Haworth, N.J., John Niel McGarvey, Drexel Hill, Pa., and Gordon Elliot Sylvester, Jamaica, N.Y., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.
Filed Apr. 13, 1973, Ser. No. 350,881
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D26—14 A



230,159
TELEPHONE STAND
Donald Michael Genaro, Haworth, N.J., John Niel McGarvey, Drexel Hill, Pa., and Gordon Elliot Sylvester, Jamaica, N.Y., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.
Filed Apr. 13, 1973, Ser. No. 350,882
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D26—14 A

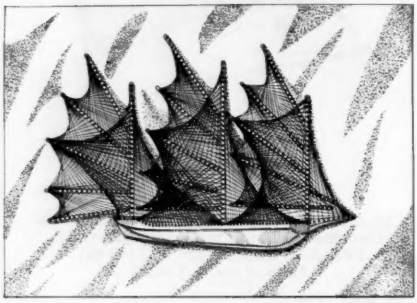
230,160
TELEPHONE STAND
Donald Michael Genaro, Haworth, N.J., John Niel McGarvey, Drexel Hill, Pa., and Gordon Elliot Sylvester, Jamaica, N.Y., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.
Filed Apr. 13, 1973, Ser. No. 350,905
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D26—14 A



230,161
ANGEL ORNAMENT
Christina Fritsche, Cincinnati, Ohio, assignor to Cincinnati Milacron Inc., Cincinnati, Ohio
Filed Nov. 21, 1972, Ser. No. 308,481
Term of patent 7 years
Int. Cl. D11—*05*
U.S. Cl. D29—1 B

230,162
STAR ORNAMENT
Christina Fritsche, Cincinnati, Ohio, assignor to Cincinnati Milacron Inc., Cincinnati, Ohio
Filed Nov. 21, 1972, Ser. No. 308,482
Term of patent 7 years
Int. Cl. D11—*05*
U.S. Cl. D29—1 B

**230,163**
**SHIP MODEL WALL PLAQUE**
Francis R. Nartowicz, 204 Fort Worth St., Hampton, Va. 23369
Filed Dec. 12, 1972, Ser. No. 314,329
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D29—23 A



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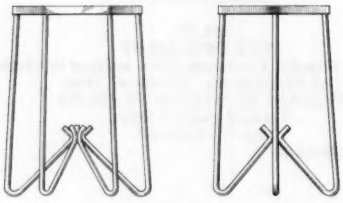
**230,164**
**AQUARIUM STAND**
Richard S. Young, Frankenmuth, and Leo E. Hearn, Flint, Mich., assignors to Pentaco Enterprises Corporation, Chesaning, Mich.
Filed June 12, 1972, Ser. No. 261,904
Term of patent 14 years
Int. Cl. D30—*02;* D06—*03*
U.S. Cl. D30—12



**230,165**
**AQUARIUM STAND**
Richard S. Young, Frankenmuth, and Leo E. Hearn, Flint, Mich., assignors to Pentaco Enterprises Corporation, Chesaning, Mich.
Filed June 12, 1972, Ser. No. 261,905
Term of patent 14 years
Int. Cl. D30—*02;* D06—*03*
U.S. Cl. D30—12

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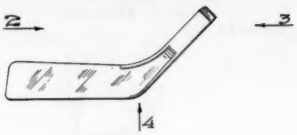
**230,166**
**HOCKEY STICK BLADE**
Raymond W. Leclerc, Leominster, Mass., (% Mylec Inc., Winchendon Springs, Mass. 01477)
Filed Aug. 13, 1971, Ser. No. 171,804
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 BC

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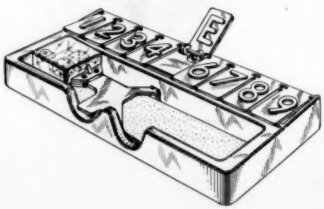
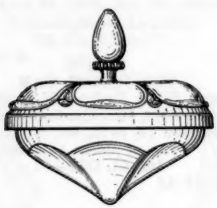
**230,167**
**DICE GAME BOARD**
Laurie J. Campbell, Raymond J. Lohr, and Charles M. Kienholz, Erie, Pa., assignors to Louis Marx & Co., Inc., New York, N.Y.
Filed Jan. 3, 1971, Ser. No. 215,237
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 GG



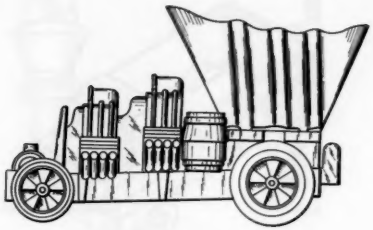
230,168
GOLF TEE
Louis E. Redmon, Rte. 1, Roscommon, Mich. 48653
Filed Jan. 18, 1973, Ser. No. 324,646
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 GT

230,169
TOP
Burr Sebring, Barrington, R.I., assignor to Gorham, a division of Textron Inc., Providence, R.I.
Filed Jan. 25, 1972, Ser. No. 220,727
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 AH

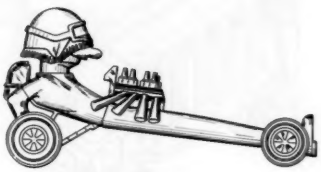


230,170
ROBOT PUSH TOY
Charles H. Hardin, Nashville, Tenn., assignor to Kusan, Inc., Nashville, Tenn.
Filed Feb. 22, 1972, Ser. No. 228,458
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 D

230,171
MINIATURE VEHICLE TOY
Robert B. Lovejoy, Hermosa Beach, Calif., assignor to Mattel, Inc., Hawthorne, Calif.
Filed Apr. 19, 1972, Ser. No. 245,682
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 AJ

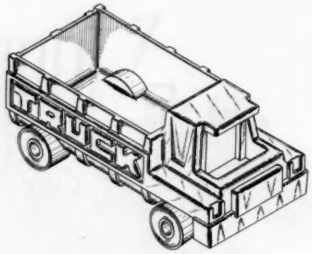


230,172
FIGURE TOY VEHICLE
Adolph E. Goldfarb, Tarzana, Delmar K. Everitt, Woodland Hills, Ronald F. Chesley, La Crescenta, and Richard D. Frierdich, Canoga Park, Calif., assignors to Mattel, Inc., Hawthorne, Calif.
Filed Apr. 28, 1972, Ser. No. 248,793
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 AJ



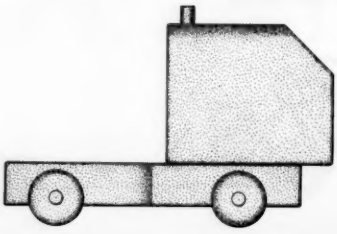
230,173
FIGURE TOY VEHICLE
Adolph E. Goldfarb, Tarzana, Delmar K. Everitt, Woodland Hills, Ronald F. Chesley, La Crescenta, and Richard D. Frierdich, Canoga Park, Calif., assignors to Mattel, Inc., Hawthorne, Calif.
Filed Apr. 28, 1972, Ser. No. 248,794
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 AJ

230,174
TOY TRUCK
Gary W. Pimentel, Fountain Valley, and Robert L. Cowell, Manhattan Beach, Calif., assignors to Mattel, Inc., Hawthorne, Calif.
Filed Oct. 12, 1972, Ser. No. 297,098
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 AJ

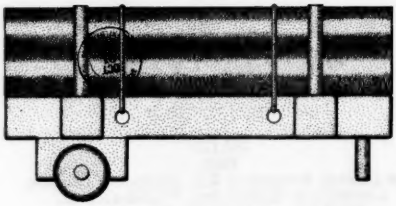


230,175
TOY TRUCK
Gary W. Pimentel, Fountain Valley, and Robert L. Cowell, Manhattan Beach, Calif., assignors to Mattel, Inc., Hawthorne, Calif.
Filed Oct. 12, 1972, Ser. No. 297,121
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 AJ

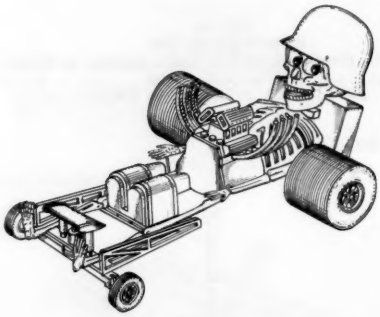
230,176
TOY TRUCK TRACTOR
Gary B. Smart, 3500 Carter Road, Portsmouth, Va. 23703
Filed Oct. 31, 1972, Ser. No. 302,407
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 AJ



230,177
TOY LOG TRAILER
Gary B. Smart, 3500 Carter Road, Portsmouth, Va. 23703
Filed Oct. 31, 1972, Ser. No. 302,408
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 AJ



230,178
TOY MODEL CAR
George Barris, North Hollywood, Calif., assignor to Zee Toys, Inc., Gardena, Calif.
Filed Dec. 18, 1972, Ser. No. 316,411
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 AJ

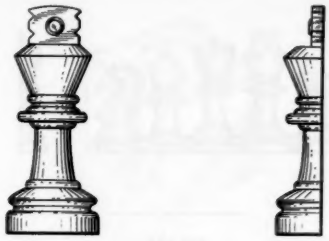


230,179
**BALL PROJECTING AND CATCHING TOY**
Richard A. Boucher, Northboro, Mass., assignor to Dart Industries Inc., Los Angeles, Calif.
Filed June 5, 1972, Ser. No. 260,040
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 PP

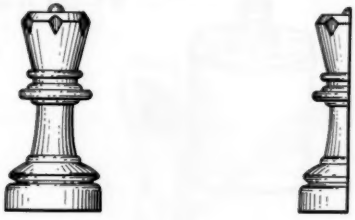
230,180
**JEWELRY FINDING**
Maurice Silber, 183—07 69th Ave., Fresh Meadows, N.Y. 11365
Filed Feb. 28, 1972, Ser. No. 230,210
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D45—19 R

230,181
**JEWELRY FINDING**
Maurice Silber, 183—07 69th Ave., Fresh Meadows, N.Y. 11365
Filed Feb. 28, 1972, Ser. No. 230,211
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D45—19 R

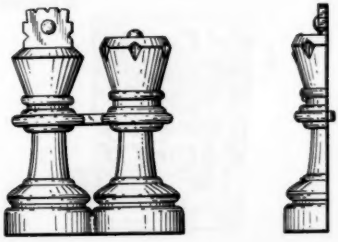
230,182
**JEWELRY FINDING**
Maurice Silber, 183—07 69th Ave., Fresh Meadows, N.Y. 11365
Filed Feb. 28, 1972, Ser. No. 230,212
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D45—19 R



230,183
**JEWELRY FINDING**
Maurice Silber, 183—07 69th Ave., Fresh Meadows, N.Y. 11365
Filed Feb. 28, 1972, Ser. No. 230,213
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D45—19 R

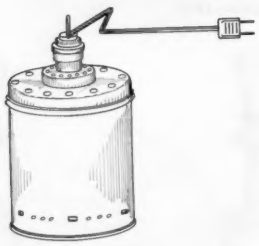


230,184
**JEWELRY FINDING**
Maurice Silber, 183—07 69th Ave., Fresh Meadows, N.Y. 11365
Filed Feb. 28, 1972, Ser. No. 230,214
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D45—19 R

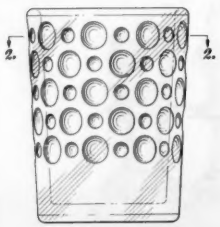


230,185
JEWELRY FINDING
Maurice Silber, 183—07 69th Ave., Fresh Meadows, N.Y. 11365
Filed Feb. 28, 1972, Ser. No. 230,215
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D45—19 R

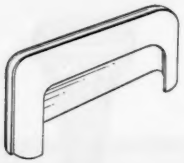
230,186
LAMP FOR PRODUCING SPECIAL LIGHTING EFFECTS
Arley I. Reinmuth, 1022 N. 32nd St., Omaha, Nebr. 68131
Filed Mar. 30, 1972, Ser. No. 239,864
Term of patent 14 years
Int. Cl. D26—*05*
U.S. Cl. D48—20 E



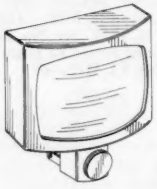
230,187
CANDLE HOLDER
Richard A. Schultz, Kansas City, Mo., assignor to Hallmark Cards, Incorporated, Kansas City, Mo.
Filed Oct. 17, 1972, Ser. No. 300,398
Term of patent 14 years
Int. Cl. D26—*01*; D7—*01*
U.S. Cl. D48—2



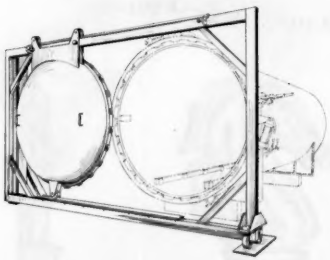

230,188
TABLE LAMP
Giuseppe Longato, Via Makalle 19, Padova, Italy
Filed May 26, 1972, Ser. No. 257,476
Term of patent 14 years
Int. Cl. D26—*05*
U.S. Cl. D48—20 R



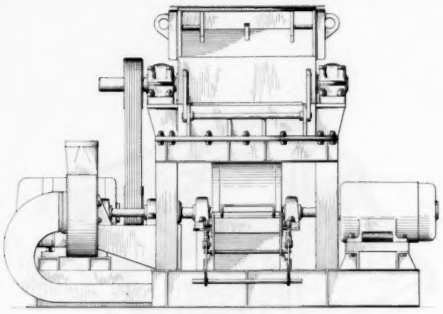
230,189
NIGHT LIGHT
Ernest W. Dietz, Torrance, and Herbert L. Kornfeld, Hollywood, Calif., assignors to Pacific Electricord Company, Gardena, Calif.
Filed June 4, 1973, Ser. No. 365,991
Term of patent 14 years
Int. Cl. D26—*05*
U.S. Cl. D48—20 F



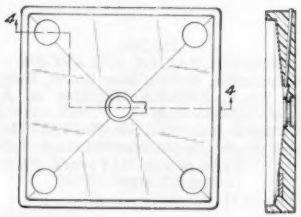
230,190
HORIZONTAL SLIDING DOOR FOR PRESSURE VESSELS
Henry J. Piegza, Clarence, N.Y., assignor to Welding and Steel Fabrication Co., Inc., Tonawanda, N.Y.
Filed Nov. 4, 1971, Ser. No. 195,891
Term of patent 14 years
Int. Cl. D15—*99*
U.S. Cl. D55—1 R



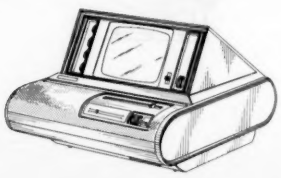
230,191
**ONE PASS COMBINATION WOOD HOGGING AND PULVERIZING MACHINE**
Harry D. Schutte, Williamsville, N.Y., assignor to Schutte Pulverizer Co., Inc., Buffalo, N.Y.
Filed May 5, 1972, Ser. No. 250,862
Term of patent 14 years
Int. Cl. D15—*09*
U.S. Cl. D55—1 B



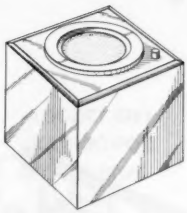
230,192
**MACHINE SUPPORT TRAY**
James L. Rutzick, 1540 Goodrich Ave., St. Paul, Minn. 55105
Filed July 5, 1972, Ser. No. 269,110
Term of patent 14 years
Int. Cl. D15—*99*
U.S. Cl. D55—1 H



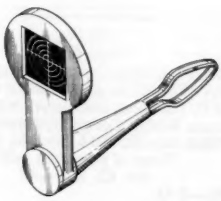
230,193
**COMBINED RADIO AND TELEVISION RECEIVER**
Osamu Sugihara, Yasunobu Nakamura, Tadashi Sumino, Kazuhiro Ueda, Makoto Terauchi, and Kiyoshi Suzuki, Osaka, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma City, Osaka, Japan
Filed Dec. 17, 1971, Ser. No. 209,495
Claims priority, application Japan June 18, 1971
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D56—4 D



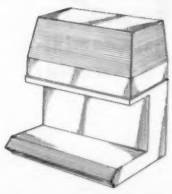
230,194
**PORTABLE RADIO RECEIVER**
George M. Buckler, Fayetteville, N.Y., assignor to General Electric Company
Filed Jan. 11, 1972, Ser. No. 217,078
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D56—4 B



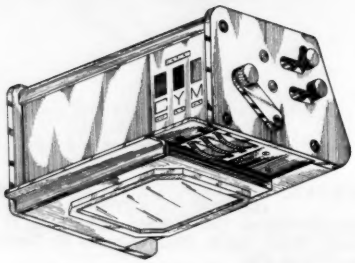
230,195
**COLLIMATING DEVICE FOR TELESCOPIC SIGHTS OR SIMILAR ARTICLE**
Susumu Fukushima, Tokyo, Japan, and Willard H. Korte, North Miami Beach, Fla., assignors to Tasco Sales, Inc., Miami, Fla.
Filed Apr. 15, 1971, Ser. No. 134,239
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. D57—1 E



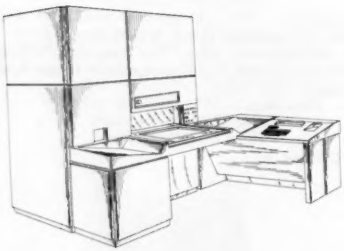
230,196
**MICROFICHE CAMERA**
Timothy P. Fitzgerald, Playa Del Rey, and William O. Nix, Newport Beach, Calif., assignors to Image Systems, Inc., Culver City, Calif.
Filed June 3, 1971, Ser. No. 149,888
Term of patent 14 years
Int. Cl. D16—*01, 03*
U.S. Cl. D61—1 B



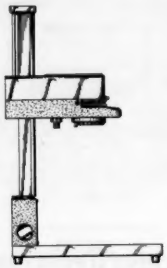
**230,197**
**COLOR LIGHT MIXER FOR A PHOTOGRAPHIC ENLARGER**
Robert A. Flieder, Englewood Cliffs, N.J., and James T. Aneshansley, Brooklyn, N.Y., assignors to Berkey Photo, Inc., New York, N.Y.
Filed Feb. 4, 1972, Ser. No. 223,804
Term of patent 14 years
Int. Cl. D16—*03*
U.S. Cl. D61—1 Q



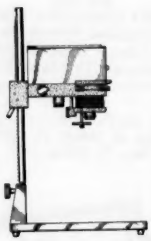

**230,198**
**COMBINED CAMERA, FILM PROCESSOR, AND PRINTER FOR APERTURE CARDS**
Thomas C. Laughon, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.
Filed July 31, 1972, Ser. No. 276,879
Term of patent 14 years
Int. Cl. D16—*03*
U.S. Cl. D61—1 Q



**230,199**
**PHOTOGRAPHIC ENLARGER**
Wilmut Pramstraller, Brixen, near Bozen, Italy, assignor to Durst S.p.A. Fabbrica Macchine ed Apparecchi Fototecnici, Bolzano, Italy
Filed Oct. 6, 1972, Ser. No. 295,710
Claims priority, application Italy Apr. 7, 1972
Term of patent 14 years
Int. Cl. D16—*03*
U.S. Cl. D61—1 Q

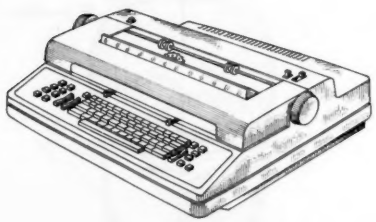


**230,200**
**PHOTOGRAPHIC ENLARGER**
Wilmut Pramstraller, Brixen, near Bozen, Italy, assignor to Durst S.p.A. Fabbrica Macchine ed Apparecchi Fototecnici, Bolzano, Italy
Filed Oct. 6, 1972, Ser. No. 295,723
Claims priority, application Italy Apr. 7, 1972
Term of patent 14 years
Int. Cl. D16—*03*
U.S. Cl. D61—1 Q

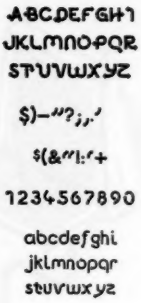


230,201
TYPEWRITER
Bill Gold, Great Neck, N.Y., and Frank C. Fusco, Dyersville, Iowa, assignors to Louis Marx & Co., Inc., New York, N.Y.
Filed Aug. 16, 1972, Ser. No. 281,061
Term of patent 14 years
Int. Cl. D18—*01*
U.S. Cl. D64—11 A

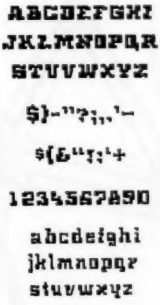
230,202
TYPEWRITER
John S. Kovacs, East Norriton, and Lewis H. Herr, Lansdale, Pa., and Richard H. Penney, New York, N.Y., assignors to Sperry Rand Corporation, New York, N.Y.
Filed Mar. 27, 1972, Ser. No. 238,734
Term of patent 14 years
Int. Cl. D18—*01*
U.S. Cl. D64—11 A



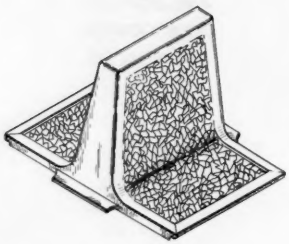
230,203
TYPE FONT
Bodo L. Kretschman, Rochester, N.Y., assignor to The Singer Company, New York, N.Y.
Filed May 26, 1972, Ser. No. 257,481
Term of patent 14 years
Int. Cl. D18—*03*
U.S. Cl. D64—12 B



230,204
TYPE FONT
Bodo L. Kretschman, Rochester, N.Y., assignor to The Singer Company, New York, N.Y.
Filed May 26, 1972, Ser. No. 257,482
Term of patent 14 years
Int. Cl. D18—*03*
U.S. Cl. D64—12 B

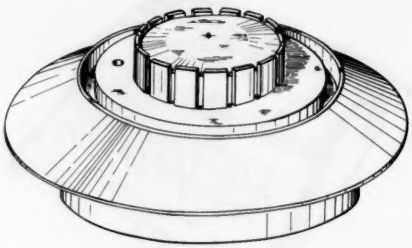


**230,205**
**HANDLE FOR COMBINED PAINT APPLYING TRIMMER AND EDGER**
Donald Seip, Somerville, N.J., assignor to Red Devil Inc., Union, N.J.
Filed Dec. 9, 1971, Ser. No. 206,572
Term of patent 7 years
Int. Cl. D8—*05*
U.S. Cl. D64—18

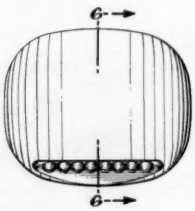


**230,206**
**SIGNAL**
Peter Hedgewick, Windsor, Ontario, and Stewart H. Birrell, Clarkson, Ontario, Canada, assignors to Reflex Corporation of Canada Limited, Windsor, Ontario, Canada
Filed Sept. 8, 1972, Ser. No. 287,294
Term of patent 14 years
Int. Cl. D29—*02*
U.S. Cl. D72—1 H

**230,207**
**COMBUSTION PRODUCTS DETECTOR**
Richard Jacob Schick, Park Ridge, and John Frederick Walker, Arlington Heights, Ill., assignors to Honeywell Inc., Minneapolis, Minn.
Filed Mar. 2, 1973, Ser. No. 337,491
Term of patent 14 years
Int. Cl. D29—*01*
U.S. Cl. D72—1 A



**230,208**
**REFLECTIVE ROADWAY MARKER**
Howard A. Schaefer, Lancaster, Ohio, assignor to Anchor Hocking Corporation, Lancaster, Ohio
Filed Apr. 25, 1973, Ser. No. 354,177
Term of patent 14 years
Int. Cl. D29—*02*
U.S. Cl. D72—1 J



230,209
REFLECTIVE ROADWAY MARKER
Howard A. Schaefer, Lancaster, Ohio, assignor to Anchor Hocking Corporation, Lancaster, Ohio
Filed Apr. 25, 1973, Ser. No. 354,178
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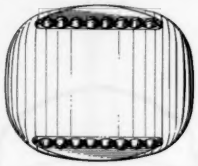
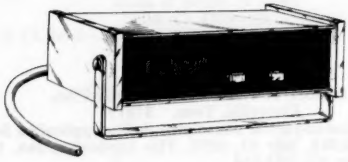


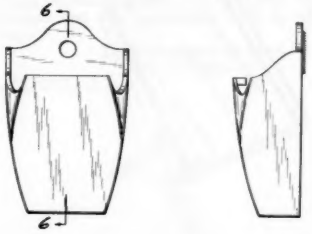
230,210
SPIROMETER MEDICAL APPARATUS
Bernard N. Gray, East Pepperell, and John W. Burke, Melrose, Mass., assignors to Life Support Equipment Corp., Burlington, Mass.
Filed Feb. 26, 1971, Ser. No. 119,434
Term of patent 14 years
Int. Cl. D24—*01*
U.S. Cl. D83—1 F



230,211
ELECTROCARDIOGRAPH
Henry E. Fuller, Wayland, Mass., assignor to Parke, Davis & Company, Detroit, Mich.
Filed Aug. 16, 1972, Ser. No. 281,070
Term of patent 14 years
Int. Cl. D24—*01*
U.S. Cl. D83—1 F

230,212
COMBINED STETHOSCOPE AND BINAURALS UNIT
Sylvan L. Hart, 545 West End Ave., New York, N.Y. 10024
Filed Apr. 11, 1973, Ser. No. 350,075
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D83—12 R

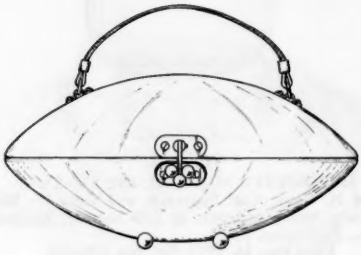
230,213
ASH TRAY
Don O. Benson and Elaine C. Benson, both of R.R. 3, Box 172A, Prior Lake, Minn. 55372
Filed Sept. 18, 1972, Ser. No. 290,213
Term of patent 7 years
Int. Cl. D27—*03*
U.S. Cl. D85—2 H



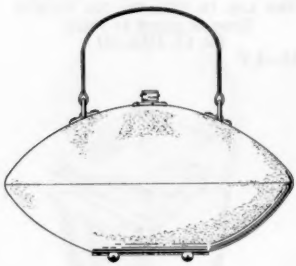
**230,214**
**BOOTJACK**
Elmer O. Billingslea, Jr., Rte. 1, Salina, Okla. 74365
Filed Dec. 14, 1972, Ser. No. 315,203
Term of patent 14 years
Int. Cl. D7—*99*
U.S. Cl. D86—10 D

**230,215**
**POCKET COIN CONTAINER**
Leo Stein, P.O. Box 1063, F.D.R. Station, New York, N.Y. 10022
Filed Dec. 29, 1971, Ser. No. 213,799
Term of patent 14 years
Int. Cl. D3—*02*
U.S. Cl. D87—3 B

**230,216**
**HANDBAG**
Clarence V. Tibbs, P.O. Box 11033, Knoxville, Tenn. 37919
Filed Apr. 26, 1972, Ser. No. 247,916
Term of patent 14 years
Int. Cl. D3—*01*
U.S. Cl. D87—3 F



**230,217**
**HANDBAG**
Clarence V. Tibbs, 7119 Kingston Pike, Knoxville, Tenn. 37919
Continuation-in-part of abandoned design application Ser. No. 270,962, July 12, 1972. This application Jan. 12, 1973, Ser. No. 323,144
Term of patent 14 years
Int. Cl. D3—*01*
U.S. Cl. D87—3 F



230,218
STAKE
Paul E. Freiling, 1006 Maertin, Fullerton, Calif. 92631, and Joseph E. Smith, 606 Clarion Place, Claremont, Calif. 91711
Filed Oct. 31, 1972, Ser. No. 302,404
Term of patent 14 years
Int. Cl. D21—*04*
U.S. Cl. D88—3 B

230,219
RAZOR HANDLE
Martin Glaberson, Stratford, and George L. Schick, Trumbull, Conn., assignors to Warner-Lambert Company, Morris Plains, N.J.
Filed Feb. 15, 1973, Ser. No. 332,960
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D95—3 A

230,220
RAZOR HANDLE
Martin Glaberson, Stratford, and George L. Schick, Trumbull, Conn., assignors to Warner-Lambert Company, Morris Plains, N.J.
Filed Feb. 15, 1973, Ser. No. 332,961
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D95—3 A

230,221
RAZOR HANDLE
Martin Glaberson, Stratford, and George L. Schick, Trumbull, Conn., assignors to Warner-Lambert Company, Morris Plains, N.J.
Filed Feb. 15, 1973, Ser. No. 332,962
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D95—3 A

230,222
RAZOR HANDLE
Martin Glaberson, Stratford, and George L. Schick, Trumbull, Conn., assignors to Warner-Lambert Company, Morris Plains, N.J.
Filed Feb. 15, 1973, Ser. No. 332,963
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D95—3 A

230,223
RAZOR HANDLE
Martin Glaberson, Stratford, Conn., assignor to Warner-Lambert Company, Morris Plains, N.J.
Division of design application Ser. No. 250,100, May 3, 1972, which is a continuation-in-part of abandoned design application Ser. No. 191,958, Oct. 22, 1971. Divided and this application July 2, 1973, Ser. No. 375,409
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D95—3 A

# LIST OF PATENTEES

## TO WHOM

## PATENTS WERE ISSUED ON THE 29TH DAY OF JANUARY, 1974

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Abbott, John A.; and Mencacci, Samuel A., to FMC Corporation. Revolving linear tube heat exchanger. 3,788,392, Cl. 165-92.000.

Abbott Laboratories: *See*—
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Abbott Tresses Inc.: *See*—
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Abegg, Karl, to Aktiengesellschaft Brown, Boveri & Cie. Two-part stator for large rotating electrical machines. 3,789,252, Cl. 2-14-72.

Abell, Frank. Method for establishing vehicle identification, speed and conditions of visibility. 3,788,201, Cl. 95-1.100.

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Acevedo, Raul. Orthodontic dental study model. 3,787,979, Cl. 32-71.000.

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Ackerman, Daniel W., to Universal Instruments Corporation. Wire wrap tool. 3,788,367, Cl. 140-124.000.

Actuated Controls Limited: *See*—
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Adams, Jay C., to Ranco Incorporated. Thermal sensing device for control circuits. 3,789,340, Cl. 338-28.000.

Adams, Phillip; and Petrocci, Alfonso N., to Millmaster Onyx Corporation. Microbiocidal naphthenyl imidazolines. 3,788,989, Cl. 252-33.000.

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Adams, Whitney R., to Scott Paper Company. Pyrolyzed structures. 3,788,938, Cl. 161-159.000.

Adler, Franklin P., to Pullman Transport Leasing Company. Gravity discharge arrangement for hoppers. 3,788,530, Cl. 222-508.000.

Advanced Technology Center, Inc.: *See*—
Claytor, Richard N.; and Eden, Dayton D., 3,789,420.

AGA Aktiebolag: *See*—
Fahlman, Gosta H.; Lundborg, Gunnar; and Westberg, Johan Eric Hayden, 3,788,311.
Knoos, Stellan; Ljungdahl, Soren F. S.; and Bostrom, Bertil Ingemar, 3,788,395.
Sandstrom, Jan Erik Stellan, 3,788,312.

Agarwal, Jagdish C.; and Wilder, Thomas C., to Kennecott Copper Corporation. Recovery of metal values from manganese nodules. 3,788,841, Cl. 75-103.000.

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De Cat, Arthur Henri; Sels, Francis Jeanne; Pollet, Robert Joseph; and Willems, Jozef Frans, 3,788,850.
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Willems, Jozef Frans; Sels, Francis Jeanne; Pollet, Robert Joseph; and De Cat, Arthur Henri, 3,788,851.

Aherin, Daniel A. Hammer with nail holder. 3,788,373, Cl. 145-30.00r.

Ahrens, Paul Raymond, to RCA Corporation. High voltage protection circuit. 3,789,260, Cl. 315-22.000.

Aihara, Mitsuo: *See*—
Idei, Gijun; Onoyama, Atsushi; Aihara, Mitsuo; Suzuki, Seigo; Egawa, Hideharu; and Yamaga, Eiichi, 3,788,058.

Aisin Seiki Kabushiki Kaisha: *See*—
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Iida, Yutaka; Hishinuma, Kazuo; Hikuma, Motohiko; Shirakawa, Tadashi; and Sakai, Susumu, 3,788,952.

Akagi, Kaurd; and Tanaka, Katushi, to Daihatsu Kogyo Co., Ltd. and Kyohuto Kaihatsu Kogyo Co., Ltd. Floor surface cleaning and dressing apparatus. 3,787,916, Cl. 15-4.000.

Akers, Artie E., to Lawrence Security, Inc. Security system operated by changes in light at specified locations. 3,789,384, Cl. 340-258.00b.

Akerstrom, Stig Hjalmar Johannes: *See*—
Kagedal, Sven Lennart; and Akerstrom, Stig Hjalmar Johannes, 3,788,948.

Akeyama, Masamoto: *See*—
Tomita, Yoshifumi; and Akeyama, Masamoto, 3,787,939.

Akins, Herbert J., Sr. Submersible pump. 3,788,771, Cl. 417-88.000.

Aktiengesellschaft Brown, Boveri & Cie: *See*—
Abegg, Karl, 3,789,252.
Stracke, Wilfried; and Zimmermann, Max, 3,788,944.

Alber, Roger L. Long-life sudsing blend and pad incorporating same. 3,788,999, Cl. 252-91.000.

Albers, Bernd G.: *See*—
Dieckman, Robert W.; Albers, Bernd G.; and Mrozek, John W., 3,788,237.

Albright & Wilson, Limited: *See*—
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All-Steel Inc.: *See*—
Massaccesi, Raymond A., 3,788,701.
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Allegheny Ludlum Industries, Inc.: *See*—
Beigay, Jack M.; Choby, Edward G., Jr.; and Kaferle, Joseph S., 3,788,112.
Muscatell, Francis L.; Ramachandran, Sundaresan; and Reen, Orville W., 3,788,836.

Allen, Benigene. Hand truck. 3,788,659, Cl. 280-5.240.

Allen, Byron W. Industrial plate glass cutter's table. 3,788,533, Cl. 225-96.500.

Allen, George Cyrus: *See*—
Levy, Leon B.; and Allen, George Cyrus, 3,789,018.

Allen, George H., to Kendall Company, The. Process for randomizing card webs. 3,787,930, Cl. 19-106.00r.

Allen, Gordon S. J., to Forward Technology Limited. Cathode ray tubes to facilitate recording. 3,789,259, Cl. 315-21.0pr.

Allen, Herbert, to Cameron Iron Works, Inc. Gate valve. 3,788,600, Cl. 251-214.000.

Allenspach, Heinz; and Meier, Eugen, to Mettler Instruments Co., AG. Force measuring apparatus including sensitivity selection means. 3,788,410, Cl. 177-25.000.

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Allied Chemical Corporation: *See*—
Curtis, Omer E., Jr.; Tuller, Harold W.; and Nussbaum, Ralph W., 3,789,038.
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Alling, Richard L., to Torrington Company, The. Bearing adapter. 3,788,715, Cl. 308-217.000.

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Andersen, Robert A.; and Maguire, Lawrence A., to Sigmatek, Inc. Multiple input signal modulator and method therefor. 3,789,323, Cl. 332-18.000.
Anderson, Carl P.: *See—*
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Anderson, Harold E., to McCulloch Corporation. Low impedance capacitor discharge system and method. 3,788,293, Cl. 123-148.00e.
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Andrews, James S., to American Stress Wire Corporation. Method and apparatus for tensioning and anchoring tensioning members. 3,787,957, Cl. 29-452.000.
Ane, Jean-Pierre; Teillard, Jean-Paul; and Ouere, Emile, to Societe Nationale Industrielle Aerospatiale. Flow limiter. 3,788,352, Cl. 137-523.000.
Anheuser-Busch, Incorporated: *See—*
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Arp, Leon J.; and Varnum, James M. (said Varnum assor. to said), 3,788,313.
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Asahi Kogaku Kogyo Kabushiki Kaisha: *See—*
Nakajima, Tohru; and Niiho, Masaaki, 3,787,988.
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Krippene, Brett C.; Peterson, Morris W.; and Marshall, David M., 3,788,796.
Modrak, Thomas M.; and Curtis, Robert W., 3,788,282.
Babcock, Clarence L.; Busdiecker, Robert A.; and Hagedorn, Erwin C. Crystallized glass ceramics and process for forming same. 3,788,865, Cl. 106-39.700.
Baberowski, Waldemar; and Spiess, Karl, to Industriewerk Schaeffler OHG. Novel vibratory conveyor. 3,788,449, Cl. 198-107.000.
Bachmann, Horst, to Fernsch G.m.b.H. Optical system for color television cameras. 3,789,135, Cl. 178-5.40e.
Bachus, Charles E. Morter debris cleanout apparatus. 3,788,017, Cl. 52-122.000.
Backwinkel, Johannes, to Blaupunkt-Werke GmbH. Sawtooth scan circuit with hold feature. 3,789,262, Cl. 315-27.0td.
Badia, Michel: *See—*
Patric, Jos; Lefebvre, Jacques; Segond, Roger; and Badia, Michel, 3,788,956.
Bagby, Thomas L., to Caterpillar Tractor Company. Apparatus for reclaiming collet hose fittings. 3,787,950, Cl. 29-237.000.
Bailey, Carl W., III: *See—*
Falkehag, Sten, II; and Bailey, Carl W., III, 3,788,808.
Bailey, John D., to Pullman Incorporated. Freight car door latching device. 3,788,007, Cl. 49-449.000.
Bailey, John D., to Pullman Incorporated. Railroad freight car door track and threshold design. 3,788,239, Cl. 105-378.000.
Bailey, John M.; Kranc, Stanley J.; and De Keyser, Richard A., to Caterpillar Tractor Company. Fuel injection system. 3,788,546, Cl. 239-120.000.
Bailey Meter Company: *See—*
Cohen, Kenneth W., 3,788,593.
Baker, David R.; and Yin, Robert I., to Fibreboard Corporation. Carton blanks printed with a heat scalable composition and method thereof. 3,788,876, Cl. 117-38.000.
Baker, Freling E.: *See—*
Webb, Wells A.; and Baker, Freling E., 3,788,496.
Baker, James T.: *See—*
Weber, Carl; Shroyer, Larry L.; and Baker, James T., 3,789,210.
Baker Oil Tools Inc.: *See—*
Curington, Alfred R., 3,788,409.

Baker Perkins Inc.: *See—*
Levi, George A., 3,788,799.
Balash, Edward: *See—*
Miner, Carroll R.; and Balash, Edward, 3,789,331.
Balchunas, William Clement; and Mila, Jose Antonio, to Western Electric Company, Incorporated. Method of and apparatus for detecting, classifying and locating insulation faults in insulated elongated conductors. 3,789,295, Cl. 324-54.000.
Baldwin, Edwin C.; and Wrenner, Warren R., to International Business Machines Corporation. Electron beam deflection control apparatus. 3,789,185, Cl. 219-121.0eb.
Baldwin, Richard R.; and Rule, Bruce J., to Hewlett-Packard Company. Optical dilatometer. 3,788,746, Cl. 356-106.000.
Balentino, Frank, Jr., to National Can Corporation. Guide rail for a conveyor. 3,788,457, Cl. 198-204.000.
Balevsky, Anguel Tonchev; Nikolov, Ivan Dimov; Nenov, Dragan Iliev; and Momchilov, Emil Nikolov, to Niitm Pri Ban. Machine for casting under pressure. 3,788,790, Cl. 425-242.000.
Balfanz, Glenn F., Jr. Lawn edging structure. 3,788,001, Cl. 47-33.000.
Ball, Frank J., to Westvaco Corporation. Method for removing sulfur dioxide from waste gases and recovering a concentrated stream of sulfurdioxide. 3,789,110, Cl. 423-539.000.
Ballast-Nedam Groep N.V.: *See—*
Hartman, Cornelis, 3,788,146.
Balogh, Roy, to McCabe-Powers Body Company. Control system for a derrick. 3,788,425, Cl. 182-148.000.
Bangor Punta Operation, Inc.: *See—*
Van Gilst, Carl, 3,788,280.
Banham, John Anthony. Door fastening units. 3,788,679, Cl. 292-40.000.
Bar-O-Matic Sales Co.: *See—*
Neidorf, Samuel W.; and Arnold, Howard K., 3,788,343.
Barber-Colman Company: *See—*
Crandall, Charles B.; and Wieneke, Frederick L., 3,787,938.
Barbin, Robert Lloyd, to RCA Corporation. Electron beam and deflection yoke alignment for producing convergence of plural in-line beams. 3,789,258, Cl. 315-13.0cg.
Barbini, Aldo, to Consiglio Nazionale delle Ricerche. Swinging apparatus for supporting containers for seaweed cultures or the like. 3,788,611, Cl. 259-54.000.
Barenyi, Bela; and Busch, Gerhard, to Daimler-Benz Aktiengesellschaft. Arrangement of the drive and support of windshield wipers. 3,788,681, Cl. 296-28.00r.
Bari, Jaime A.; Maffitt, Kent N.; and Sievers, Jerry A., to Minnesota Mining and Manufacturing Company. Multiple electron mirror apparatus and method. 3,789,370, Cl. 340-173.0cr.
Barkan, Philip; Barton, Robert S.; Skreiner, Klaus M.; and Tognella, Ugo R., to General Electric Company. Earthquake-protective support system for electrical apparatus. 3,789,174, Cl. 200-168.00r.
Barke, Bernd: *See—*
Rossie, Egbert; and Barke, Bernd, 3,788,686.
Barkmann, Herman G., to Q-dot Corporation. Heat exchange system. 3,788,388, Cl. 165-32.000.
Barlow, George Joseph, to Honeywell Information Systems, Inc. Self-checking digital storage system. 3,789,204, Cl. 235-153.0am.
Barney, Walter W. Coded magnetic card and system for encoding and sensing the same. 3,788,617, Cl. 235-61.12m.
Barre, Jean-Gabriel: *See—*
Holt, Terence Albert; and Barre, Jean-Gabriel, 3,787,915.
Barrera, Roberto Gonzalez: *See—*
Rubio, Manuel; and Leal, Victor Mario, 3,788,139.
Barrett, Monroe C.: *See—*
Faehini, Robert M.; Kenna, Fenton L., Jr.; Barrett, Monroe C.; Nickla, Louis E.; and Graham, Robert L., 3,788,495.
Bartlett, Homer E.: *See—*
Rosa, Jack; and Bartlett, Homer E., 3,789,407.
Bartlett, Philip Lee, to Du Pont de Nemours, E. I., and Company. Solid lubricant additives dispersed in perfluoroalkyl ethers with perfluoroalkyl ether acid dispersants. 3,788,987, Cl. 252-25.000.
Barton, James C.; Christensen, Jon C.; and Mueller, James R., to Caterpillar Tractor Company. Vehicle seat. 3,788,697, Cl. 297-307.000.
Barton, Robert S.: *See—*
Barkan, Philip; Barton, Robert S.; Skreiner, Klaus M.; and Tognella, Ugo R., 3,789,174.
BASF Wyandotte Corporation: *See—*
Stephenson, Orlando W., III; and Schmidt, John E., 3,788,966.
Bashaw, Arthur E. Watercraft with rotatable floating pontoons. 3,788,256, Cl. 114-39.000.
Bataille, Roger; Maison, Francois P.; and Curvale, Pierre Paul, to Electronique Marcel Dassault. Radiolocation system. 3,789,411, Cl. 343-113.00r.
Batdorf, Jack B.; and Weiss, Steven M., to Hercules Incorporated. Concrete compositions or mixes and additive therefor. 3,788,869, Cl. 106-93.000.
Batsch, Guy, to Societe Civile Textile dite Socitex. Twisting devices for filaments. 3,788,057, Cl. 57-77.400.
Battelle Development Corporation: *See—*
Crites, Nelson A.; and Schaer, Glenn R., 3,788,955.
Strohecker, Daniel E., 3,788,128.
Battelle Memorial Institute: *See—*
Crites, Nelson A., 3,788,186.
Schneider, Karl; Cuenoud, Gerard; Bouladon, Gabriel; and Zuppiger, Paul, 3,788,232.
Batts, John H.: *See—*
Garrison, Judd F.; and Batts, John H., 3,788,488.
Batts, John Thomas, Inc.: *See—*
Garrison, Judd F.; and Batts, John H., 3,788,488.
Bauer, George B.; and Thornberg, Dean S., said Thornberg assor. to E-System, Inc. Pendulum stabilization for antenna structure with radome. 3,789,414, Cl. 343-761.000.
Bauerle, Mathias, GmbH, Firma: *See—*
Lehmann, Werner, 3,788,638.
Baumann, Reinhold; Kunze, Ernst-Gunter; Lauerbach-Lehmeier, Robert; Striebich, Alfred; and Rothe, Hans-Joachim, to Zimmer Aktiengesellschaft. Process for the production of regenerate. 3,789,026, Cl. 260-2.300.
Baxter Laboratories, Inc.: *See—*
Arrigo, Anthony L., 3,788,119.
Bayer Aktiengesellschaft: *See—*
Breer, Karl, 3,788,337.
Kalz, Dietmar; Wolfrum, Gerhard; and Neeff, Rutger, 3,788,810.
Nassenstein, Heinrich; and Fitzky, Hans-Georg, 3,788,728.
Traubel, Harko; and Klebert, Wolfgang, 3,789,027.
Traubel, Harro; Weber, Karl-Arnold; Koch, Otto; and Konig, Klaus, 3,788,887.
Beakbane, Henry, (Fortox) Limited: *See—*
Knowles, Peter M., 3,788,377.
Bear, Fred B.; and Jefferey, Owen E., to Victor Comptometer Corporation. Adjustable bow sight. 3,787,984, Cl. 33-265.000.
Bearden, Roby, Jr.; MacMullin, Robert B.; Lewis, William E.; and Welty, Albert B., Jr., to Esso Research and Engineering Company. Process for the desulfurization of petroleum oil stocks. 3,788,978, Cl. 208-208.00n.
Beaudoin, Yvon; and Gingras, Claude A., said Beaudoin assor. to said Gingras, Claude A. Multiple-speed transmission with reverse drive. 3,788,167, Cl. 74-762.000.
Beausoleil, William F.; Ho, Irving T.; and Yu, Hwa Nien, to International Business Machines Corporation. Dyanmically ordered bidirectional shift register having charge coupled devices. 3,789,247, Cl. 307-304.000.
Beck, Russell R.; George, David B.; and Anderson, Charles W., to Kennecott Copper Corporation. Process for producing pelletized metal sulfide materials. 3,789,097, Cl. 264-82.000.
Beck, Warren R.; and Sweeny, Norman P., to Minnesota Mining and Manufacturing Company. Incompressible, conformable structure containing cellular particles. 3,787,908, Cl. 5-348.0wb.
Beckman Instruments, Inc.: *See—*
Rohrbaugh, Donald G., 3,788,815.
Rohrbaugh, Donald G.; and Pearson, William R., 3,788,816.
Becton, Dickinson, and Company: *See—*
Kitzie, John, 3,788,602.
Becton, Dickinson Electronics Company: *See—*
Wilner, Leslie B., 3,788,149.
Bednarczyk, Julian F.; and Gate, James M., to Westinghouse Electric Corporation. Two-piece bladed diaphragm for an axial flow machine. 3,788,767, Cl. 415-217.000.
Beebe, Raymond A., to Massey-Ferguson, Inc. Pneumatic seed dispenser. 3,788,518, Cl. 221-211.000.
Behrendt, John W., to United States of America, Navy. Frame for low frequency source. 3,789,401, Cl. 340-8.00s.
Beier, Helmut; Handke, Siegfried; and Konczal, Wolfgang, to Siemens Aktiengesellschaft. Electric compressed-gas circuit breaker. 3,789,175, Cl. 200-148.00r.
Beiertz, Hans, to Farbwerke Hoechst Aktiengesellschaft vormals Meister Lucius & Bruning. Dyeing polyamide bonded fleece by dwelling with method complex azo dyestuffs. 3,788,807, Cl. 8-26.000.
Beigay, Jack M.; Choby, Edward G., Jr.; and Kaferlf, Joseph S., to Allegheny Ludlum Industries, Inc. Mechanical shaping. 3,788,112, Cl. 72-46.000.
Beisch, Hanspeter E.; and Kaman, Frank A., to Skil Corporation. Safety retracting mechanism for the lower guard of a portable saw. 3,787,973, Cl. 30-391.000.
Bell, David F.; Johari, Girish C.; and McNulty, Edward R., to International Business Machines Corporation. Voltage level control for D.C.-to-D.C. converter. 3,789,289, Cl. 321-2.000.
Bell, Heinz G.; and Stepper, Heinz J., to Westinghouse Electric Corporation. Non-sag incandescent tungsten filament for an incandescent lamp. 3,789,255, Cl. 313-217.000.
Bell, Larry E. Boat guide device. 3,788,502, Cl. 214-84.000.
Bell Northern Research Ltd.: *See—*
Lenaeris, George Victor; Laing, Graham Sterling; Morrell, Ronald Joseph; and Willis, Wesley Nelson (said Laing assor. to), 3,789,348.
Bell Telephone Laboratories, Incorporated: *See—*
Beurrier, Henry Richard, 3,789,314.
Beurrier, Henry Richard, 3,789,315.
Bonyhard, Peter Istvan, 3,789,373.
Bridges, Thomas James; and Nguyen, Van-Tran, 3,789,235.
Cantor, Barry Ira, 3,789,242.
Chen, Yu-Ssu; Geusic, Joseph Edward; and Nelson, Terrence John, 3,789,375.
Heightley, John Donnell, 3,789,206.
Hess, William Emil, Jr., 3,789,241.
Kotwicki, Allan Joseph, 3,789,199.
Krambeck, Robert Harold; and Walden, Robert Henry, 3,789,267.
Larsen, Arthur Bertel, 3,789,132.
Major, Norman Lionel, 3,789,146.
May, Paul Hillard, 3,789,304.

Medill, David Gordon; and O'Neill, John Francis, 3,789,152.
Medill, David Gordon, 3,789,154.
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Unger, Burton Abram, 3,788,911.
Yarnell, Charles Frederick, 3,788,898.

Bell-Northern Research Ltd.: *See—*
Maheux, Peter Francis, 3,789,342.

Belvedere, Paul C. Protective face mask and padding material therefor. 3,787,895, Cl. 2-9.000.

Bement, Elmore: *See—*
Sievenpiper, Frederic Leory; and Bement, Elmore, 3,788,811.

Benasutti, Louis D.; and Chernek, Joseph D., to General Motors Corporation. Waterline retractor for refrigerator cabinet. 3,788,094, Cl. 62-339.000.

Bendix Corporation, The: *See—*
Miller, Donald L., 3,788,099.
Sliney, John T., 3,788,579.

Benjamin, Milton L.; Walker, David D.; and Miles, Wilbur N., to Erickson Tool Company. Instant change tool holder. 3,788,658, Cl. 279-75.000.

Bennett, Brian Garner; and Holmes, William Samuel, to Albright & Wilson, Limited. Production of nitrogen and phosphorous-containing compounds. 3,788,986, Cl. 252-1.000.

Bennett, James R., to Evans Products Company. Car shipping apparatus. 3,788,238, Cl. 105-368.00r.

Bergstrom, Theodore R., to Minnesota Mining and Manufacturing Company. Filter. 3,788,486, Cl. 210-496.000.

Bergwerksverband G.m.b.H.: *See—*
Juntgen, Harald; Knoblauch, Karl; Zundorf, Dieter; and Gappa, Gunther, 3,788,985.

Beringer, Monique: *See—*
Buchmann, Paul; and Beringer, Monique, 3,788,471.

Berkowitz, Sidney, to FMC Corporation. Formulating with a non-burning chlorinated dry bleach. 3,789,000, Cl. 252-95.000.

Bernard, Andre; Gagne, Pierre; Gras, Georges; and Neel, Jean, to Societe Civile dite Soltex. Textile material coated with a waterproofing agent. 3,788,884, Cl. 117-121.000.

Bernstein, Jack: *See—*
Narayanan, Venkatachala L.; and Bernstein, Jack, 3,789,073.

Bernstein, Jack, to Squibb, E. R., & Sons, Inc. Carboxamides. 3,789,072, Cl. 260-557.00b.

Berrange, Aubrey Ralph, to South African Inventions Development Corporation. Impact roller apparatus. 3,788,757, Cl. 404-124.000.

Berry Metal Company: *See—*
Bintrim, Donald D., 3,788,235.

Bertinetti, Emilio Alberto: *See—*
Cigala, Vincenzo; and Bertinetti, Emilio Alberto, 3,788,155.

Besnyo, George Frank: *See—*
Brown, William B.; Besnyo, George Frank; and Hornor, Eugene Marshall, 3,788,213.

Besser, Paul J.: *See—*
Mee, Jack E.; and Besser, Paul J., 3,788,896.

Bessette, Oliver Edward, to RCA Corporation. High density isolated multi-channel magnetic circuit transducer. 3,789,156, Cl. 179-100.20c.

Beta Crafts, Incorporated: *See—*
Hasselbach, Arthur, 3,788,590.

Bethlehem Steel Corporation: *See—*
Gelles, Nicholas; Shiley, Paul J.; and Casella, Michael D., 3,788,690.
Miller, Timothy W., 3,788,624.
Peoples, Richard A., 3,788,272.
Stephens, Paul F., 3,788,864.

Beurrier, Henry Richard, to Bell Telephone Laboratories, Incorporated. Amplifier utilizing input signal power. 3,789,314, Cl. 330-185.000.

Beurrier, Henry Richard, to Bell Telephone Laboratories, Incorporated. Hybrid couplers. 3,789,315, Cl. 330-185.000.

Beymer, Glen E. Extension for a mobile continuous siding machine. 3,788,115, Cl. 72-181.000.

Billeri, Fulvio: *See—*
Billeri, Tullio; and Billeri, Fulvio, 3,788,004.

Billeri Ricardo & Frigli S.n.c.: *See—*
Billeri, Tullio; and Billeri, Fulvio, 3,788,004.

Billeri, Tullio; and Billeri, Fulvio, to Billeri Ricardo & Frigli S.n.c. Systems for opening and closing access apertures in the outer walls of tannery paddle tumblers and the like. 3,788,004, Cl. 49-41.000.

Billi, G. & C., S.p.A.: *See—*
Billi, Giorgio, 3,788,104.

Billi, Giorgio, to Billi, G. & C., S.p.A. Yarn changer for multi-feed circular knitting machines. 3,788,104, Cl. 66-138.000.

Bindernagel, Ali; and Mattheis, Friedrich Karl, to Kocks, Friedrich, Firma. Rolls. 3,787,942, Cl. 29-125.000.

Bingham, Ronald E.; Cecil, Thomas F.; Galli, Guido; and Poquette, Gereon E., to International Business Machines Corporation. Corona charging device. 3,789,278, Cl. 317-262.00a.

Binkley Company, The: *See—*
Kiselewski, Donald L., 3,788,019.

Binks-Bullows, Limited: *See—*
Guise, Frank, 3,788,554.

Bintrim, Donald D., to Berry Metal Company. Support structure for turn wheel of cable-driven chair lift. 3,788,235, Cl. 104-191.000.

Bio/Physics Systems, Inc.: *See—*
Friedman, Mitchell; Kamensky, Louis A.; and Klinger, Isaac, 3,788,744.

Birchall, James Derek; and Cassidy, John Elward, to Imperial Chemical Industries, Limited. Fibrous materials. 3,788,885, Cl. 117-126.0af.

Bish, Raymond C. Saddlebag-travel case for a motorcycle. 3,788,532, Cl. 224-31.000.

Bishop, Billy H. Fluid lift mechanism and underground housing. 3,788,197, Cl. 92-77.000.

Bishop, Gerald B., to Ford Motor Company. Accelerator pump system. 3,788,615, Cl. 261-34.00a.

Bjorn, James M.; and Johnson, C. Walter. Frame for hanging folders in file cabinets. 3,788,718, Cl. 312-184.000.

Black and Decker Manufacturing Company: *See—*
Ehrlich, Stephen Jeffrey, 3,788,049.

Black Clawson Fiberclaim, Inc., mesne: *See—*
Marsh, Paul G., 3,788,568.

Black Sivalls & Bryson, Inc.: *See—*
Arenson, Edwin M., 3,788,825.

Blackmer, David E. Compander with control signal logarithmically related to the instantaneous RMS value of the input signal. 3,789,143, Cl. 179-15.55r.

Blackwell, Robert E., to Westinghouse Electric Corporation. Flow meter. 3,788,141, Cl. 73-194.00b.

Blair, Boyd C., to Brackett Stripping Machine Co., Inc. Glue applying device. 3,788,270, Cl. 118-5.000.

Blakely Industries: *See—*
Blakely, James T., 3,788,362.

Blakely, James T., to Blakely Industries. Automatic loom filling winder. 3,788,362, Cl. 139-247.000.

Blaupunkt-Werke GmbH: *See—*
Backwinkel, Johannes, 3,789,262.
Prolss, Hans; and Hegeler, Wilhelm, 3,789,362.

Bloomfield, Roger D., to Uniflo Systems Company. Valve for levitated vehicle track. 3,788,231, Cl. 104-23.0fs.

Blount, Eric Albert, to Marconi Company Limited, The. Tracker ball arrangements. 3,789,218, Cl. 250-231.0se.

Blymiller, Arthur L.; and Snodgrass, John E., to United States of America, Air Force. Frequency discriminator device. 3,789,399, Cl. 343-14.000.

Boehland, Robert R., Jr., to Feather Hill Industries, Inc. Feeder for clinging type birds. 3,788,279, Cl. 119-52.00r.

Boehringer Ingelheim G.m.b.H.: *See—*
Kruger, Gerd; Zipp, Otmar; Keck, Johannes; Nickl, Josef; Machleidt, Hans; Ohnacker, Gerhard; Engelhorn, Robert; and Puschmann, Sigfrid, 3,789,125.

Boeing Company, The: *See—*
Henson, Alfred J.; and Lewis, Richard W., 3,789,198.

Boettcher, Clifford T.; and Creasman, David O.; deceased (by Creasman, Frances S.; administratrix). Automatic and semi-automatic reel tenders. 3,788,575, Cl. 282-86.50r.

Bolex International SA: *See—*
Oulevay, Serge; and Thevenaz, Jean, 3,788,736.

Bolt Associates, Inc.: *See—*
Chelminski, Stephen V., 3,788,402.

Bonner, Alvin T., Sr., to Singer Company, The. Universal knife block for tufting machines. 3,788,245, Cl. 112-79.00r.

Bonnett, Charles O. Windrow controller. 3,788,053, Cl. 56-399.000.

Bonomo, Otto A.: *See—*
Valente, Raymond L.; and Bonomo, Otto A., 3,787,947.

Bonyhard, Peter Istvan, to Bell Telephone Laboratories, Incorporated. Magnetic, single wall domain, or logic using chevron domain propagating elements. 3,789,373, Cl. 340-174.0tf.

Bonzano, Giorgio; Lesca, Pier Carlo; and Ponzano, Luigi, to Olivetti, Ing., C., & C., S.p.A. Transducer positioning mechanism. 3,789,378, Cl. 340-174.10c.

Booth, Richard L., to Taylor, S. G., Chain Company, Inc. Chain inspection and repair system. 3,788,062, Cl. 59-35.000.

Borg-Warner Corporation: *See—*
Holdeman, John W.; and McMillen, Kenneth G., 3,788,075.
Johnson, Raymond E.; Miller, Wendell E.; and McMillen, Kenneth G., 3,788,077.
Shuey, Scott James; Smith, Wallace Leland; and Wilk, Harold G., 3,788,764.

Borneman, Lawrence A., to Dick, A. B., Company. Stencil duplicator with master making and pneumatic handling features. 3,788,221, Cl. 101-116.000.

Bornett, Charles B.; and Morrison, Larry A., to Diebold, Incorporated. Pneumatic tube carrier end closure construction. 3,788,577, Cl. 243-35.000.

Borst, Walter. Ball-pitching device. 3,788,297, Cl. 124-7.000.

Bosch, Robert, G.m.b.H.: *See—*
Kurz, Hanns; and Linder, Siegfried, 3,788,964.
Leutner, Volkmar; and Romes, Roman, 3,788,775.
Schwerin, Guenther, 3,788,709.
Van der Kolk, Hans-Jurgen, 3,788,773.

Boschen, William O.; and Griesbaber, Otto A., to Carter, Ralph B., Company. Waste water process tank control facility. 3,788,472, Cl. 210-103.000.

Bose, Robert N. Method for accelerating the molding cycle by blanketing with dry carbon dioxide gas. 3,789,093, Cl. 264-37.000.

Bostrom, Bertil Ingemar: *See—*
Knoos, Stellan; Ljungdahl, Soren F. S.; and Bostrom, Bertil Ingemar, 3,788,395.

Bottoms, Eugene R., to Chevron Research Company. Method of accurately measuring, depthwise, well casing collars for interpretative purposes. 3,789,292, Cl. 324-34.00r.

Bouchard, Joseph. Sterilizing apparatus. 3,789,228, Cl. 250-993.000.

Bouladon, Gabriel: *See—*
Schneider, Karl; Cuenoud, Gerard; Bouladon, Gabriel; and Zuppiger, Paul, 3,788,232.

Bowe, Bohler & Weber KG: *See—*
Burger, Hurst, 3,787,986.

Bowler, Lauren L., to General Motors Corporation. Anti-theft system including a pushbutton electronic combination ignition lock and transmission shift control. 3,788,422, Cl. 180-114.000.

Bowman, Brian, to Britis.. Steel Corporation. Arc furnaces. 3,789,127, Cl. 13-12.000.

Boyer, Wilhelm: *See—*
Ritter, Josef; Gott, Hans; Ritter, Klaus; Gamillscheg, Otto; Boyer, Wilhelm; and Ritter, Gerhard, 3,788,122.

Bozoian, Michael; Krugler, Allen D., Jr.; and Radin, Bernard G., to Ford Motor Company. Electric circuitry for vehicle speed responsive system. 3,788,421, Cl. 180-105.00r.

Brackett Stripping Machine Co., Inc.: *See—*
Blair, Boyd C., 3,788,270.

Braddon, David V.: *See—*
Falkehag, Sten I.; and Braddon, David V., 3,789,043.

Bragg, Kenneth R., to Parker-Hannifin Corporation. Fuel tank inerting system with means to improve thermal stability of fuel. 3,788,039, Cl. 55-160.000.

Bragg, Kenneth R.; and Kenyon, Richard L., to Parker-Hannifin Corporation. Fuel tank inerting system. 3,788,040, Cl. 55-160.000.

Brahler, George R. Container closure. 3,788,512, Cl. 220-25.000.

Brainard, James L.; and Palm, Robert J. Vehicle wheel and spider therefor. 3,788,705, Cl. 301-9.0dn.

Brainerd Manufacturing Co.: *See—*
Lippman, Aaron H., 3,788,107.

Brandt, Alan: *See—*
Rabenhorst, David W.; Brandt, Alan; Darnell, Kenneth E.; and George, James F., 3,788,162.

Brass, Robert L. Toy mail box. 3,787,987, Cl. 35-1.000.

Braun, Ernst: *See—*
Braun, Gert; and Braun, Ernst, 3,788,458.

Braun, Gert; and Braun, Ernst, to Halbach & Braun. Conveyor trough connecting joint construction. 3,788,458, Cl. 198-204.000.

Braun, Peter: *See—*
Buttner, Gert; Hartmann, Adolf; and Braun, Peter, 3,789,031.

Braun, W., Company: *See—*
Lerner, Nathan B., 3,787,904.

Brayton Cycle Improvement Associates, mesne: *See—*
Nebgen, William H., 3,788,066.

Brazzel, Ronald D.: *See—*
Shell, Don C.; Tanner, David A.; and Brazzel, Ronald D., 3,788,037.

Breer, Karl, to Bayer Aktiengesellschaft. Apparatus and process for mixing components which react quickly with one another, more especially for the production of foam materials. 3,788,337, Cl. 137-1.000.

Breglia, Denis R.; Mohon, Windell N.; and Mulson, Joseph F., to United States of America, Navy. Laser direct fire simulator employing refractive media. 3,788,733, Cl. 350-287.000.

Breikss, Ivars Peter, to Honeywell Inc. Compensation of reproduced signal by measuring deviation of recorded reference signal. 3,789,379, Cl. 340-174.10h.

Bremner, David F., to National Cash Register Company, The. Price setting keys and method of transferring price to printer. 3,789,193, Cl. 235-61.11r.

Bresson, Clarence R.; and Cobb, Raymond L., to Phillips Petroleum Company. Novel multifunctional hydroxy compounds. 3,789,069, Cl. 260-514.00j.

Brettrager, Donald R.: *See—*
Check, John M.; and Brettrager, Donald R., 3,788,198.

Breunsbach, Maurice C., to Spirolet Corporation. Nozzle. 3,788,353, Cl. 137-604.000.

Breunsbach, Maurice C., to Spirolet Corporation. Liquid injection adaptor. 3,788,557, Cl. 239-401.000.

Brewer, John A. Piston engine. 3,788,286, Cl. 123-43.00c.

Brewer, Robert W., to General Motors Corporation. All-metal check valve for air injection system. 3,788,071, Cl. 60-293.000.

Brezina, Jan. Automatic cigarette lighter. 3,789,187, Cl. 219-261.000.

Bridges, Thomas James; and Nguyen, Van-Tran, to Bell Telephone Laboratories, Incorporated. Far infrared coherent radiation source employing charge carrier spin nonlinearity in a magnetic field. 3,789,235, Cl. 307-88.300.

Bridigum, Robert J.: *See—*
Glass, William H.; and Bridigum, Robert J., 3,788,769.

Brilloii, Jacques, to L'Air Liquide Societe Anonyme pour l'Etude et l'Exploitation dqs Procedes Georges Claude. Cryogenic gas traps. 3,788,096, Cl. 62-55.500.

British Iron and Steel Research Associates, The: *See—*
Hoyle, Geoffrey; and Longbottom, David Melvin, 3,788,381.

British Petroleum Company Limited, The: *See—*
Cook, Terence John; and Olive, Martin Frederick, 3,789,082.

British Steel Corporation: *See—*
Bowman, Brian, 3,789,127.

Brock, Larry D.; Games, John E.; and Saunders, John, to United Aircraft Corporation. Course/fine synchro altimeter converter. 3,789,391, Cl. 340-347.00e.

Brock, Robert James; Hansen, Paul Bernard; and Wilson, John C., to Kimberly-Clark Corporation. Nonwoven laminate containing bonded continuous filament. 3,788,936, Cl. 161-148.000.

Broerman, Arthur B. Medical adhesive solvent composition. 3,789,118, Cl. 424-45.000.

Brooks, Frank W.; and Naismith, Thomas D., to General Motors Corporation. Disc brake and wheel assembly. 3,788,429, Cl. 188-18.00a.

Brorein, William J.; and Humen, Nicholas, to General Cable Corporation. Electrical connector for telephone cords. 3,789,344, Cl. 339-59.00m.

Brose, Peter, to Sick, Erwin, Firma. Needle monitoring device for circular knitting machines. 3,788,105, Cl. 66-157.000.

Brotherton, Thomas Kemper: *See—*
Colomb, Henry Octave, Jr.; Trecker, David John; and Brotherton, Thomas Kemper, 3,789,042.

Brown, Boveri & Cie Aktiengesellschaft: *See—*
Goehle, Rolf; Velten, Walter; and Knirsch, Gunther, 3,789,334.

Brown, Boveri & Company Limited: *See—*
Winter, Peter, 3,789,233.

Brown, Hazel V.: *See—*
Brown, William B.; Besnyo, George Frank; and Hornor, Eugene Marshall, 3,788,213.

Brown, Malcolm B., to United States of America, Navy. Ordnance handling device. 3,788,680, Cl. 294-81.00r.

Brown, William B.; deceased (by Brown, Hazel V.; representative); Besnyo, George Frank; and Hornor, Eugene Marshall, to Western Electric Company, Incorporated. Methods of and apparatus for marking successive sections of an elongated material. 3,788,213, Cl 101-37.000.

Brown, William David; and Thomson, Richard Noel, to Dunlop Limited. Inflatable seals. 3,788,651, Cl. 277-34.000.

Brown, William J., to Chemplex Company American Can Company. Continuous forms leader. 3,788,536, Cl. 226-91.000.

Bru, Michel, to Ets J. J. Carnaud & Forges de Basse-Indre. Sheet feeding cylinder. 3,788,639, Cl. 271-53.000.

Bruer, James D.; Buddington, Donald L.; and Klein, Walter F., to International Business Machines Corporation. Dictation apparatus with disc loading, feeding, and ejecting feature. 3,789,160, Cl. 179-100.20z.

Brumett, Billy M., to Hawley Manufacturing Corporation. Spring securement means for sealing web. 3,788,208, Cl. 98-115.0vm.

Brundage, Horace W.: *See—*
Evans, Robert A.; and Brundage, Horace W., 3,787,920.

Brunel University: *See—*
Jeffries, Thomas Oliver, 3,788,234.

Bruning, Leslie. Drain guard for contact lens. 3,788,485, Cl. 210-474.000.

Bruno, Joseph S.: *See—*
Harper, Robert J., Jr.; Gautreaux, Gloria A.; Bruno, Joseph S.; and Donoghue, Matthew J., 3,788,804.

Brunswick Corporation: *See—*
Strong, William A., 3,788,267.

Brusa, Ugo. Electric furnace for heating and melting scrap iron and steel. 3,789,126, Cl. 13-10.000.

Buchmann, Fred J.; Eidt, Clarence M., Jr.; Mason, Ralph B.; and Hamner, Glen P., to Esso Research and Engineering Company. Hydrocracking process utilizing mixed nonnoble metal catalyst. 3,788,974, Cl. 208-59.000.

Buchmann, Paul; and Beringer, Monique, to Solco Basel AG. Dialysis apparatus. 3,788,471, Cl. 210-94.300.

Buckbee-Mears Company: *See—*
Frantzen, John J.; and Lund, Charles M., 3,788,912.

Budd, Allan L.; Foster, Robert E.; and Greenberg, Jonathan S., to Monitor Labs, Inc. Gas permeation tube and method for the filling thereof. 3,788,545, Cl. 239-34.000.

Buddington, Donald L.: *See—*
Bruer, James D.; Buddington, Donald L.; and Klein, Walter F., 3,789,160.

Buechler, Lester W., to Systems Research Laboratories, Inc. Distance indicating optical probe. 3,788,741, Cl. 356-4.000.

Buelow, William H.; Mohrbacker, William J.; and Mihulowicz, George, to Rexnord, Inc. Lubricant system for drive and support of concrete mixer drum. 3,788,610, Cl. 259-177.000.

Bukama GmbH Hanover: *See—*
Lange, Wilfried, 3,788,195.

Bunker-Ramo Corporation, The: *See—*
Jen, Dixson Teh-Chao; and Lotan, Amram Zvi, 3,789,365.

Burger, Edgar P., to Ford Motor Company. Rain cap for exhaust pipe. 3,788,072, Cl. 60-324.000.

Burger, Hurst, to Bowe, Bohler & Weber KG. Blower for vehicle-drying installation. 3,787,986, Cl. 34-229.000.

Burkness, Donald C.; and Warlick, William W., Jr., to United States of America, Army. Serial code translator. 3,789,390, Cl. 340-347.0dd.

Burlington Northern, Inc.: *See—*
Slusher, Leonard G., 3,788,498.

Burns, Bland Calvin. Vacuum sewage conveying with vacuum operated valve. 3,788,338, Cl. 137-1.000.

Burns, Louis O., to General Signal Corporation. Actuator unit. 3,788,194, Cl. 91-386.000.

Burns, William E.; and Taylor, Robin, to Interlake Inc. Transfer car arrangement. 3,788,499, Cl. 214-16.40b.

Burri, Hans, to Heberlein & Co. AG. Apparatus for selectively changing the sense of rotation of the twist tube of a false-twist machine. 3,788,056, Cl. 57-77.450.

Burroughs Corporation: *See—*
Holz, George E.; and Ogle, James, 3,789,265.

Kupsky, George Andrew, 3,787,940.

Burton, Christopher Philip, to International Computers, Limited. Error indicating display. 3,789,385, Cl. 340-324.00r.

Bury, George John, to Illinois Tool Works Inc. Alternate action switch convertible to momentary by putting latch on different pivot. 3,789,173, Cl. 200-153.00j.

Busch, Francis R., to General Electric Company. Gas conditioning and analyzing system. 3,788,813, Cl. 23-232.00e.

Busch, Gerhard: *See*—
Barenyi, Bela; and Busch, Gerhard, 3,788,681.

Busdiecker, Robert A.: *See*—
Babcock, Clarence L.; Busdiecker, Robert A.; and Hagedorn, Erwin C., 3,788,865.

Buslik, Walter Siegbert, to International Business Machines Corporation. Magnetic tape cartridge and storage apparatus. 3,788,576, Cl. 242-199.000.

Buttner, Gert; Hartmann, Adolf; and Braun, Peter, to Farbwerke Hoechst Aktiengesellschaft vormals Meister Lucius & Bruning. Copolyester fibers and filaments having defined shrinking properties. 3,789,031, Cl. 260-75.00t.

Buxton, Alan, to Associated Engineering, Limited. Plastic coatings for articles and a method of producing same. 3,788,961, Cl. 204-181.000.

Byrd, Jerry A. Garbage can rack. 3,788,583, Cl. 248-146.000.

Cachat, John F., to Park-Ohio Industries Inc. Modified inductor for inductively heating valve seats. 3,789,180, Cl. 219-10.570.

Caflisch, Edward G.; Reed, Denvil E., Jr.; and Williamson, Kenneth D., to Union Carbide Corporation. Process for upgrading dripolene. 3,788,979, Cl. 208-255.000.

Cahn, Robert L. Receptacle carrier for an automatic conveying system. 3,788,451, Cl. 198-131.000.

Califano, Frank L.; and Laszlo, Joseph, to Flintkote Company, The. Method for making tile products. 3,788,925, Cl. 156-269.000.

California Controls Company: *See*—
West, Benjamin W., 3,788,350.

California Institute of Technology: *See*—
George, Nicholas, 3,788,743.

Callus Memories, Inc.: *See*—
O'Brien, Terence J., 3,789,273.

Camacho, Vasco G.: *See*—
Anderson, James J.; Camacho, Vasco G.; and Kinney, Robert E., 3,789,091.

Camarasa, Mario; and Kraus, Bernhard Josef, to Esso Research and Engineering Company. Purification of internal combustion engine exhaust gas. 3,788,070, Cl. 60-290.000.

Cambridge Instrument Company, Inc.: *See*—
Fawcett, Howard, 3,789,423.

Camco, Incorporated: *See*—
Terral, Ben D.; and McGowen, Harold E., Jr., 3,788,397.

Cameli, Nazzareno: *See*—
Longi, Paolo; Cameli, Nazzareno; Valvassori, Alberto; Parodi, Sandro; and Cervi, Remo, 3,789,036.

Cameron, Clyde Fraser, to Victoria Industries, Ltd. Mechanical jack. 3,788,604, Cl. 254-108.000.

Cameron Iron Works, Inc.: *See*—
Allen, Herbert, 3,788,600.

Camp, John W. A., to Ford Motor Company. Clutch release bearing. 3,788,437, Cl. 192-98.000.

Campanella, Samuel Joseph; Suyderhoud, Henri George; and Onufry, Michael, Jr., to Communications Satellite Corporation (Comsat). Echo canceller with variable threshold. 3,789,165, Cl. 179-170.200.

Campau, Walter J., to Chrysler Corporation. Shock absorbing starter clutch mechanism. 3,788,151, Cl. 74-7.00a.

Campbell, Roger G., Sr.; Goff, Richard E., Jr.; and Priestley, Joseph A., to Johnson & Johnson. Narrow elastic fabric for use as waistband in articles of apparel. 3,788,365, Cl. 139-421.000.

Campbell, Roger G., Sr.; Goff, Richard E., Jr.; and Guay, Normand D., to Johnson & Johnson. Narrow elastic fabric. 3,788,366, Cl. 139-421.000.

Canadian General Electric Company, Limited: *See*—
Thayer, Victor R., 3,789,113.

Candiani, Giampiero, to Societa Italiana Telecomunicazioni Siemens S.p.A. Binary-code compressor. 3,789,392, Cl. 340-347.0dd.

Cannon, Maxwell R., to International Business Machines Corporation. Digital recording at twice nyquist bandwidth. 3,789,380, Cl. 340-174.10g.

Canon Kabushiki Kaisha: *See*—
Sugiura, Muneharu; and Hirose, Ryusho, 3,788,731.

Cantor, Barry Ira, to Bell Telephone Laboratories, Incorporated. Overvoltage and undervoltage detection circuit. 3,789,242, Cl. 307-235.00r.

Cantrell, C. M., 40% to Petrek, John P. Interphase mass transfer process from lamina flowing films .005 in. thick. 3,788,954, Cl. 203-89.000.

Caraway, Mitchell R.: *See*—
Simmons, Smith H.; and Caraway, Mitchell R., 3,788,018.

Carborundum Company: *See*—
Loricchio, Domingos, 3,789,050.

Carbuny, Max, to Westinghouse Electric Corporation. Gas monitoring system. 3,788,742, Cl. 356-5.000.

Cardinal Industries Incorporated: *See*—
Staab, Donald C., 3,788,704.

Carlisle, Denis Richard; and Nichols, John Joseph, to United Kingdom of Great Britain and Northern Ireland, Secretary of State for Defense in Her Britannic Majesty's Government of the. Fuel burners. 3,788,067, Cl. 60-39.74b.

Carlson, Floyd E. Radial piston pump. 3,788,779, Cl. 417-462.000.

Carlson, Kenneth G. Flow-thru palletizer and depalletizer. 3,788,497, Cl. 214-6.00p.

Carlson, Paul E.; and Schimmel, Ralph U., to Mack Trucks, Inc. Transmission shifting apparatus. 3,788,157, Cl. 74-364.000.

Carney, Richard William James; and De Stevens, George, to Ciba-Geigy Corporation. Tertiary aminoacids as anti-inflammatory agents. 3,789,123, Cl. 424-310.000.

Carossino, Andre, to Messrs. Neumo Armaturenfabrik Apparatebau Metallgiesserei GmbH. Debarring tool. 3,787,972, Cl. 30-317.000.

Carpenter, Edward J.; and Leyde, Warren L., to Pacific Technology, Inc. Simulated load forecast and control apparatus. 3,789,201, Cl. 235-151.210.

Carpenter, Guy H.; and Ross, Ernest E., to Perma Glas-Mesh Corporation. Apparatus for applying pressure sensitive adhesive to glass fiber mesh material. 3,788,271, Cl. 118-33.000.

Carpenter, Loyde M.; Kiser, James W.; and Leonard, Lee V., to General Electric Company. Actuating mechanism for a limit switch having elongated pivotally mounted actuating member. 3,789,177, Cl. 200-172.00a.

Carpenter, William T., to Synalloy Corporation. Method for liquid treatment of textile material webs. 3,788,809, Cl. 8-152.000.

Carrier Corporation: *See*—
Miller, Kenneth H., 3,788,778

Carrona, John J.: *See*—
Freedman, Norman S., granted to United States Atomic Energy Commission under the provision of 42 U.S.C. 2182; Horsting, Carel W.; Lawrence, Walter F.; and Carrona, John J., 3,787,958.

Carter, Ivor W.: *See*—
Meyer, Earl W., Jr.; Carter, Ivor W.; and Scott, Ian J. C., 3,789,168.

Carter, Ivor W.; and Scott, Ian J. C., to Chrysler Corporation. Distributor actuator unit with solenoid advance. 3,788,290, Cl. 123-117.00a.

Carter, James L.; and Sinfelt, John H., to Esso Research and Engineering Company. Method for preparation of catalysts. 3,789,020, Cl. 252-442.000.

Carter, Ralph B., Company: *See*—
Boschen, William O.; and Grieshaber, Otto A., 3,788,472.

Caruso, Philip J., Jr.: *See*—
Caruso, Philip J., Jr.; Rasmussen, Lyle E.; and Scarbrough, Joseph E. (said Rasmussen and said Scarbrough assors. to said), 3,789,296.

Caruso, Philip J., Jr.; Rasmussen, Lyle E.; and Scarbrough, Joseph E., said Rasmussen and said Scarbrough assors. to said Caruso, Philip J., Jr. Moisture monitor system. 3,789,296, Cl. 324-58.50b.

Casco Products Corporation: *See*—
Welk, Horace B., Jr., 3,788,357.

Casella, Michael D.: *See*—
Gelles, Nicholas; Shiley, Paul J.; and Casella, Michael D., 3,788,690.

Casey, Robert, to Caterpillar Tractor Company. Clamping mechanism for side shiftable backhoe. 3,788,674, Cl. 280-456.000.

Cassella Farbwerke Mainkur Aktiengesellschaft: *See*—
Heid, Christian; and Heinrich, Ernst, 3,788,806.

Cassidy, John Elward: *See*—
Birchall, James Derek; and Cassidy, John Elward, 3,788,885.

Castela, Andre; and Joubert, Philippe, to Institut Francais du Petrole, des Carburants et Lubrifiants. Apparatus for applying a substantially constant tension to an elongated member connected to an installation subject to alternating movements. 3,788,073, I. 60-413.000.

Castela, Andre; and Joubert, Philippe, to Institut Francais du Petrole, des Carburants et Lubrifiants. Device supplying a working fluid under a determined pressure. 3,788,074, Cl. 60-413.000.

Caterpillar Tractor Company: *See*—
Bagby, Thomas L., 3,787,950.
Bailey, John M.; Kranc, Stanley J.; and De Keyser, Richard A., 3,788,546.
Barton, James C.; Christensen, Jon C.; and Mueller, James R., 3,788,697.
Casey, Robert, 3,788,674.
Clancy, Lawrence F.; Lee, Emil B., Jr.; Smart, William O.; and Yancey, John W., 3,788,418.
Hart, Cullen P.; and Rosenberger, Paul C., 3,788,166.
Scheidt, James E.; and White, Robert W., 3,788,401.

Catherall, Reginald; and Knowles, Susan, to Solartron Electronic Group Limited. Function generation by approximation employing interative interpolation. 3,789,203, Cl. 235-152.000.

Cecil, Thomas F.: *See*—
Bingham, Ronald E.; Cecil, Thomas F.; Galli, Guido; and Poquette, Gereon E., 3,789,278.

Cegedur Societe de Transformation de l'Aluminum Pechiney: *See*—
Patric, Jos; Lefebvre, Jacques; Segond, Roger; and Badia, Michel, 3,788,956.

Celanese Corporation: *See*—
Levy, Leon B.; and Allen, George Cyrus, 3,789,018.

Centralalarm International, Inc.: *See*—
Oestreicher, Warren J., 3,789,382.

Centre Technique de Cuir: *See*—
Holt, Terence Albert; and Barre, Jean-Gabriel, 3,787,915.

Centro Sperimentale Metallurgico S.p.A.: *See*—
Di Stefano, Vittorio, 3,788,969.

Cervi, Remo: *See—*
Longi, Paolo; Cameli, Nazzareno; Valvassori, Alberto; Parodi, Sandro; and Cervi, Remo, 3,789,036.

Chabloz, Olivier: *See—*
Simmen, Robert; and Chabloz, Olivier, 3,788,229.

Chabot, Seroe. Hoist assembly for use on scaffolds. 3,788,424, Cl. 182-129.000.

Chafetz, Harry; Cullen, William P.; and Miller, Edward F., to Texaco Inc. Method for treating nitrogen-containing polymeric dispersants. 3,789,076, Cl. 260-583.00n.

Chandler, William T. Crash bar bracket assembly. 3,788,688, Cl. 292-92.000.

Charter Enterprises, Inc.: *See—*
West, James I., Jr., 3,788,086.

Chatourel, Pierre: *See—*
Jasson, Philippe; and Chatourel, Pierre, 3,788,380.

Chaurand, Patrice; Magnan, Regis; and Coquery, Jean-Paul, to Progil and Ciments Lafarge. Process of manufacturing anhydrous calcium sulfate form II and products obtained by this process. 3,789,111, Cl. 423-555.000.

Chaussy, Leon-Michel: *See—*
Wenzel, Werner; and Chaussy, Leon-Michel, 3,788,838.

Chauvet, Edmond; and Prevote, Andre, to L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude. Sheet positioning apparatus. 3,788,634, Cl. 269-154.000.

Check, John M.; and Brettrager, Donald R., to Raycon Corporation. Fluid supported rectangular slide unit. 3,788,198, Cl. 92-86.000.

Cheever, Leo H.: *See—*
Williams, Thurston V.; and Cheever, Leo H., 3,788,009.

Chelminski, Stephen V., to Bolt Associates, Inc. Automatically self-regulating variable-stroke variable-rate and quiet-operating pile drive apparatus. 3,788,402, Cl. 173-91.000.

Chemische Werke Huls A.G.: *See—*
Heidel, Klaus, 3,789,046.

Chemplex Company American Can Company: *See—*
Brown, William J., 3,788,536.

Chen, Godfrey: *See—*
Abbott, Dominic C.; and Chen, Godfrey, 3,788,332.

Chen, Yu-Ssu; Geusic, Joseph Edward; and Nelson, Terrence John, to Bell Telephone Laboratories, Incorporated. Single wall domain nucleater. 3,789,375, Cl. 340-174.0tf.

Chernek, Joseph D.: *See—*
Benasutti, Louis D.; and Chernek, Joseph D., 3,788,094.

Chervenak, Michael C.: *See—*
Wolk, Ronald H.; Chervenak, Michael C.; and Alpert, Seymour B., 3,788,973.

Chester, Frank S.; Johnson, Claude O.; Kavanagh, Ira Keith; and van Horik, Leonard R., to McDonnell, Douglas, Corporation. Method of forming honeycomb. 3,788,117, Cl. 72-296.000.

Chevron Research Company: *See—*
Bottoms, Eugene R., 3,789,292.

Chicago Bridge & Iron Company: *See—*
Delahunty, Terry Wayne, 3,788,385.

Childers, Clifford W.; and Clark, Earl, to Phillips Petroleum Company. Blends of styrene/acrylonitrile copolymers with block copolymers containing lactones and a resinous or rubbery polymer. 3,789,084, Cl. 260-873.000.

Childress, Lorenza S.; and Gundrum, Ralph J., to International Business Machines Corporation. Circle or arc generator for graphic display. 3,789,200, Cl. 235-151.000.

Chilimoniuk, Wlodzimierz: *See—*
Chomczyk, Wlodzimierz; and Chilimoniuk, Wlodzimierz, 3,788,780.

Chivian, Jay S.; Claytor, Richard N.; and Eden, Dayton D. Binary logic apparatus. 3,789,421, Cl. 346-1.000.

Cho, Antonio. Adjustable angle plate arrangement. 3,788,633, Cl. 269-60.000.

Choby, Edward G., Jr.: *See—*
Beigay, Jack M.; Choby, Edward G., Jr.; and Kaferlf, Joseph S., 3,788,112.

Choi, Ung So: *See—*
Nam, Joon Woo; and Choi, Ung So, 3,787,929.

Chomczyk, Wlodzimierz; and Chilimoniuk, Wlodzimierz, to Wyzsza Szkola Inzynierska. Intake-valve-free compressor. 3,788,780, Cl. 417-493.000.

Chomerics, Inc.: *See—*
Seeger, Richard E., Jr.; and Coulter, John G., 3,789,167.

Christensen, Jon C.: *See—*
Barton, James C.; Christensen, Jon C.; and Mueller, James R., 3,788,697.

Christiano, Victor: *See—*
Van Raalte, John A.; and Christiano, Victor, 3,788,892.

Christie, Ian Robert Arthur; and Ward, John Joseph Bernard, to International Lead Zinc Research Organization, Inc. Electrodeposition of chromium. 3,788,957, Cl. 204-51.000.

Christy, Daniel Lamar. Machine for dispensing and distributing dry flowable materials. 3,788,529, Cl. 222-314.000.

Chrysler Corporation: *See—*
Campau, Walter J., 3,788,151.
Carter, Ivor W.; and Scott, Ian J. C., 3,788,290.
Meyer, Earl W., Jr.; Carter, Ivor W.; and Scott, Ian J. C., 3,789,168.
Scott, Ian J. C., 3,789,349.

Chubu Seiki Kabushiki Kaisha: *See—*
Nitta, Hifumi; and Kaneko, Mitsutaka, 3,789,294.

Church, Peter K.; and Knutson, Oliver J., to Kaman Sciences Corporation, mesne. Method of impregnating porous refractory bodies with inorganic chromium compound. 3,789,096, Cl. 264-60.000.

Ciba-Geigy Corporation: *See—*
Carney, Richard William James; and De Stevens, George, 3,789,123.
Riccio, Pasquale R., 3,788,556.
Suryanarayana, Yelagondahally S.; and Reid, Luther J., Jr., 3,789,021.
Thornton, Marvin L.; and Riccio, Pasquall R., 3,788,525.
Thornton, Marvin L.; and Riccio, Pasquale R., 3,788,526.

Cigala, Vincenzo; and Bertinetti, Emilio Alberto. Reinforced molded plastic pulleys. 3,788,155, Cl. 74-230.010.

Cincinnati Milacron Chemicals Inc.: *See—*
Hechenbleikner, Ingenuin A.; Hussar, John F.; Koeniger, Arthur F.; and Pressler, Robert L., 3,789,064.

Cincinnati Mine Machinery Co., The: *See—*
Krekeler, Claude B., 3,788,711.

Claar, Leslie M.: *See—*
Lansky, Zdenek J.; and Claar, Leslie M., 3,788,076.

Clancy, Lawrence F.; Lee, Emil B., Jr.; Smart, William O.; and Yancey, John W., to Caterpillar Tractor Company. System for cooling an hydraulic excavator. 3,788,418, Cl. 180-68.00r.

Clark, Adrian Percy, to Plessey Telecommunications Research Company. Code division multiplex system. 3,789,149, Cl. 179-15.0bc.

Clark, Allen L.: *See—*
German, Dale F.; and Clark, Allen L., 3,788,598.

Clark, Burton Parker: *See—*
Rose, Richard Stephen; and Clark, Burton Parker, 3,788,191.

Clark, Earl: *See—*
Childers, Clifford W.; and Clark, Earl, 3,789,084.

Clark Equipment Company: *See—*
York, Donald W., 3,788,431.

Clark, George Cyril, Jr.; and Davis, Robert Curtis, to Harris-Intertype Corporation. Synchronism indicator for a convolutional decoder. 3,789,359, Cl. 340-146.10d.

Clark, George Cyril, Jr.; and Davis, Robert Curtis, to Harris-Intertype Corporation. Convolutional decoder. 3,789,360, Cl. 340-146.1aq.

Clark, James M., to International Telephone and Telegraph Corporation. Frame synchronization system. 3,789,307, Cl. 328-155.000.

Clarke, James A., to Dow Chemical Company, The. Oxazolidinone modified triglycidyl ether of trihydroxy triphenyl methane and derivatives thereof. 3,789,053, Cl. 260-47.0cn.

Clay, Robert: *See—*
Jenkins, Joe H., 3,788,000.

Claytor, Richard N.: *See—*
Chivian, Jay S.; Claytor, Richard N.; and Eden, Dayton D., 3,789,421.

Claytor, Richard N.; and Eden, Dayton D., to Advanced Technology Center, Inc. Wide band recording apparatus. 3,789,420, Cl. 346-1.000.

Clifton, John R.; and Edwards, Gary S., to United States of America, Navy. Jet ignition device for a pyrotechnic fuze. 3,788,227, Cl. 102-7.00r.

Clough, Roy L., Jr., to Xodar Corporation. Agitating and aerating apparatus. 3,788,616, Cl. 261-64.00r.

Cloyd, Harold S., to Nosco Plastics, Incorporated. Plug valve. 3,788,599, Cl. 251-181.000.

Cobb, Raymond L.: *See—*
Bresson, Clarence R.; and Cobb, Raymond L., 3,789,069.

Cocca, Theodore F.; and Sanders, Paul J., to Spacetac Incorporated. Method of making resistor. 3,787,965, Cl. 29-620.000.

Cogar Corporation: *See—*
Finster, Leslie P.; Petkovsek, Richard J.; and Reader, Trevor D., 3,788,571.

Cohen, Howard. Calibrated bracket securing means. 3,787,976, Cl. 32-14.00a.

Cohen, Hyman L.; King, James R., Jr.; and Minsk, Louis M. Novel polymers and photographic elements containing same. 3,788,855, Cl. 96-84.00r.

Cohen, Kenneth W., to Bailey Meter Company. Fluidic timer. 3,788,593, Cl. 251-28.000.

Cole, David R.; and Worrix, Matthew L., to Allis-Chalmers Corporation. Switch operating device with spiral spring charging means and cam release means. 3,789,172, Cl. 200-153.0sc.

Cole, Raymond C.; Hittel, William C.; and Donaghy, James G., to International Playtex Corporation. Methods and apparatus for constructing knitted brassiere blanks and brassieres. 3,789,098, Cl. 264-103.000.

Colebrand, Limited: *See—*
Tusch, Nicholas Norbert; Watson, Robert Ian; and Taylor, Jack, 3,788,273.

Coleman Company, Inc., The: *See—*
Steffes, William J., 3,788,336.
Vincent, Marcel, 3,788,412.

Coleman, H. Paris, to United States of America, Navy. Circularly symmetric retrodirective antenna. 3,789,417, Cl. 343-816.000.

Colgate-Palmolive Company: *See—*
Painelli, Daniele, 3,789,001.

Colin, Jean Paul, to Societe Financiere et Industrielle des Ateliers et Chantiers de Bretagne. Coupling device of use inter alia for the connection between a barge and a pusher tug. 3,788,259, Cl. 114-235.00a.

Colin, Jean Paul, to Societe Financiere et Industrielle des Ateliers et Chantiers de Bretagne. Locking device more particularly for connection between a barge and a pusher tug. 3,788,261, Cl. 114-235.00a.
Collins, Arthur J. Container closure. 3,788,510, Cl. 215-40.000.
Collins, David A.: *See—*
Lile, Derek L.; and Collins, David A., 3,789,369.
Collins, Fred P.: *See—*
Rearwin, Richard H.; and Collins, Fred P., 3,789,302.
Colomb, Henry Octave, Jr.; Trecker, David John; and Brotherton, Thomas Kemper, to Union Carbide Corporation. Radiation curable dinorbornene compositions. 3,789,042, Cl. 260-17.4cl.
Colonna, Jean, to Gaz de France. Safety flap-valve. 3,788,595, Cl. 251-58.000.
Colorant Schmuckstein GmbH, Firma: *See—*
Elbe, Maximo, 3,788,097.
Colorfax Company, Limited: *See—*
Matsushima, Hiromi, 3,789,425.
Colovas, Denny D.; Logan, John S.; and Skruch, Richard R., to Ford Motor Company. Guided transportation system. 3,788,233, Cl. 104-88.000.
Colt Industries Operating Corporation: *See—*
Verner, Dalton R., 3,789,182.
Columbia Broadcasting System, Inc.: *See—*
Smith, John A.; and Miller, Stephen A., 3,787,996.
Columbia Precision Corporation: *See—*
Adams, Robert E., 3,788,563.
Adams, Robert E., 3,788,565.
Combustion Engineering, Inc.: *See—*
Misenti, Angelo J.; and Notari, Gennaro V., 3,788,943.
Polsak, Edwin Mark; and Kalfas, Donald Joseph, 3,788,244.
Commercial Electronics, Inc.: *See—*
Kline, Donald D., 3,789,133.
Communications Satellite Corporation: *See—*
Shimasaki, Nobuhiko; and Rapuano, Robert, 3,789,142.
Communications Satellite Corporation (Comsat): *See—*
Campanella, Samuel Joseph; Suyderhoud, Henri George; and Onufry, Michael, Jr., 3,789,165.
Compagnie Industriells des Telecommunications Cit-Alcatel: *See—*
Propice, Roger; and Da Rocha, Carlos, 3,788,440.
Compagnie Internationale pour l'Informatique: *See—*
Derville, Denis, 3,789,368.
Concast AG: *See—*
Koenig, Peter J.; and Hofmanner, Friedrich, 3,788,840.
Concrete Cutting Equipment, Incorporated: *See—*
Dempsey, Edward Justing; Kent, David Earl; and Hudspeth, Patrick William, 3,789,279.
Condit, Philip M.: *See—*
Sweeney, Thomas E.; Condit, Philip M.; and Ormiston, Robert A., 3,788,578.
Conklin, Clement L., Jr., to United States of America, Army. Valve reference system for high acceleration environment. 3,788,351, Cl. 137-512.100.
Conley, Larry R., to Accra-Point Arrays Corporation. Through-insulation welding method and apparatus. 3,789,183, Cl. 219-92.000.
Connell, Lehman J.; and Johnson, Jeffrey L., to General Motors Corporation. Energy absorber for collapsible steering columns or the like. 3,788,148, Cl. 74-492.000.
Consiglio Nazionale delle Ricerche: *See—*
Barbini, Aldo, 3,788,611.
Consolidated Foods Corporation: *See—*
Evans, Robert A.; and Brundage, Horace W., 3,787,920.
Container Corporation of America: *See—*
Geisel, Charles E., 3,788,035.
Continental Can Company, Inc.: *See—*
Hentsch, Helmut O., 3,788,548.
Vercillo, Peter A., 3,788,508.
Continental Homes, Inc.: *See—*
Hazelett, Earl T., Jr., 3,789,102.
Conway, Walter D. Apparatus for filtration. 3,788,483, Cl. 210-416.000.
Cook, James J. Stack-wall. 3,788,026, Cl. 52-749.000.
Cook, Terence John; and Olive, Martin Frederick, to British Petroleum Company Limited, The. Isomerisation of paraffin hydrocarbons. 3,789,082, Cl. 260-683.680.
Cooper, Duane H.: *See—*
Putnam, Milton T.; and Cooper, Duane H., 3,789,328.
Cooper, George P., to North American Rockwell Corporation. Radar sweep generator. 3,789,261, Cl. 315-27.0td.
Cooper, James Joseph, Jr., to International Telephone and Telegraph Corporation. Insulation piercing connector for underground installation. 3,789,347, Cl. 339-97.00r.
Coppa, Anthony P. Three-dimensional folded structure with curved surfaces. 3,788,934, Cl. 161-17.000.
Coquery, Jean-Paul: *See—*
Chaurand, Patrice; Magnan, Regis; and Coquery, Jean-Paul, 3,789,111.
Coquillion, Jean; deceased (by Coquillion, Marie-Josephe; executrix); and Jay, Pierre, to Progil. Chlorinated dielectric liquids. 3,788,998, Cl. 252-65.000.
Coquillion, Marie-Josephe: *See—*
Coquillion, Jean; and Jay, Pierre, 3,788,998.
Cordes, Phil Heinrich: *See—*
Mensenkamp, Ewald; and Cordes, Phil Heinrich, 3,788,880.
Coriale, Samuel D., to Xerox Corporation. Image compensation method and apparatus for electrophotographic devices. 3,788,739, Cl. 355-17.000.
Corning Glass Works: *See—*
De Luca, Robert D., 3,788,827.
Cortez, Edward, to Fairchild Industries, Inc. Recognition system and processor. 3,789,361, Cl. 340-146.3aq.
Coulter Electronics, Inc.: *See—*
Godin, Thomas J., 3,788,484.
Coulter, John G.: *See—*
Seeger, Richard E., Jr.; and Coulter, John G., 3,789,167.
Coury, Arthur J.; Rogier, Edgar R.; Schwebke, Gerald L.; and Cozad, Douglas D., to General Mills Chemicals, Inc. Reaction of polyisocyanates with compounds containing blocked amine groups in the presence of acids or metal salts of acids. 3,789,045, Cl. 26018.0tn.
Cozad, Douglas D.: *See—*
Coury, Arthur J.; Rogier, Edgar R.; Schwebke, Gerald L.; and Cozad, Douglas D., 3,789,045.
Craig, Herbert C.; and Lamphier, Walter C., to Sprague Electric Company. Wound capacitor. 3,789,277, Cl. 317-260.000.
Crail, Ian Robert Henry: *See—*
Elliott, John Scotchford; Crail, Ian Robert Henry; and Askew, Herbert Frank, 3,788,990.
Crandall, Charles B.; and Wieneke, Frederick L., to Barber-Colman Company. Method and apparatus for drawing in warp threads. 3,787,938, Cl. 28-44.000.
Crandall, William B.; and Lee, Charles M., Jr., to Sybron Corporation. Low porosity coating and method for producing same. 3,788,874, Cl. 117-23.000.
Crane, Jacob: *See—*
Shapiro, Eugene; Crane, Jacob; and Eichelman, George H., Jr., 3,788,902.
Creasman, David O.: *See—*
Boettcher, Clifford T.; and Creasman, David O., 3,788,575.
Creasman, Frances S.: *See—*
Boettcher, Clifford T.; and Creasman, David O., 3,788,575.
Creighton, Stephen Mark; Mitchell, David Lawrence; and Kay, William Chee, to Research Counsil of Alberta. Seedling container. 3,788,003, Cl. 47-56.000.
Crile, Eugene E.: *See—*
Wright, Lawrence W.; Tolleson, Leon H.; Abrahamson, Daniel P.; Thomas, Paul M.; and Crile, Eugene E., 3,789,101.
Crites, Nelson A., to Battelle Memorial Institute. Stress indication. 3,788,186, Cl. 85-62.000.
Crites, Nelson A.; and Schaer, Glenn R., to Battelle Development Corporation. Encapsulation. 3,788,955, Cl. 204-25.000.
Crompton & Knowles Corporation: *See—*
Gardiner, Robert A., 3,788,387.
Kronoff, Clarence R.; and Hayden, Donald F., 3,788,361.
Crooks, James W., to Smith, R. L., Gear Company. Winch mechanism. 3,788,607, Cl. 254-186.00r.
Crystal, Richard G.: *See—*
Wellman, Russel E.; and Crystal, Richard G., 3,788,994.
Cuenoud, Gerard: *See—*
Schneider, Karl; Cuenoud, Gerard; Bouladon, Gabriel; and Zuppiger, Paul, 3,788,232.
Cuevas, Ephraim A., to PPG Industries, Inc. Method of producing high purity lithium chloride. 3,789,059, Cl. 260-437.00r.
Cullen, William P.: *See—*
Chafetz, Harry; Cullen, William P.; and Miller, Edward F., 3,789,076.
Cunnell, James. Wheel trim retention. 3,788,707, Cl. 301-37.00p.
Cunniff, John G.: *See—*
Kosowsky, Leo N.; Lovejoy, Curtis N.; and Cunniff, John G., 3,788,963.
Curington, Alfred R., to Baker Oil Tools Inc. Percussion bits. 3,788,409, Cl. 175-410.000.
Curtis, Omer E., Jr.; Tuller, Harold W.; and Nussbaum, Ralph W., to Allied Chemical Corporation. Production of low molecular weight polyanhydrides and epoxy compositions derived therefrom. 3,789,038, Cl. 260-17.200.
Curtis, Robert W.: *See—*
Modrak, Thomas M.; and Curtis, Robert W., 3,788,282.
Curvale, Pierre Paul: *See—*
Bataille, Roger; Maison, Francois P.; and Curvale, Pierre Paul, 3,789,411.
Curzon, Joseph H. Rubber plumber. 3,787,905, Cl. 4-256.000.
Custom Tool & Machine Co., Inc.: *See—*
Nelson, Leonard, 3,788,635.
Cutlas Gear & Mfg, Inc.: *See—*
Prulter, Clarence M., 3,788,435.
Cutshall, Charles E., to Elco Industries, Inc. Controlled-drive sealing fastener. 3,788,185, Cl. 85-1.0jp.
Cutter Laboratories, Inc.: *See—*
Davis, Loren Roger; and Kirkland, Walter Dean, 3,788,524.
Da Rocha, Carlos: *See—*
Propice, Roger; and Da Rocha, Carlos, 3,788,440.
Dai Nippon Insatsu Kabushiki Kaisha: *See—*
Takeuchi, Satoshi; and Saito, Hachiro, 3,788,738.
Daihatsu Kogyo Co., Ltd.: *See—*
Akagi, Kaurd; and Tanaka, Katushi, 3,787,916.
Daimler-Benz Aktiengesellschaft: *See—*
Barenyi, Bela; and Busch, Gerhard, 3,788,681.
Dale Refrigeration Company: *See—*

Lauterbach, William E., 3,788,093.

Dalena, Rudolph; Onishi, Roy K.; and Walker, Donald F., to Hughes Aircraft Company. Digital line graphics control on range scalable radar CRT display. 3,789,403, Cl. 343-5.0dp.

Dalmasso, Claudio, to Olivetti, Ing., C., & C., S.p.A. Circuit package. 3,789,341, Cl. 339-17.0cf.

Daniel, Arnold; and Richey, Joseph Burdette, II. Metal casting apparatus. 3,788,382, Cl. 164-150.000.

Daniels, Dennis, to U.S. Amada, Ltd. Tapping head for punch press. 3,788,760, Cl. 408-130.000.

Darnell, Kenneth E.: *See—*
Rabenhorst, David W.; Brandt, Alan; Darnell, Kenneth E.; and George, James F., 3,788,162.

Dausch, Ernst; Kubler, Friedrich; Hempel, Theodor; and Fuchs, Franz, to SKF Kugellagerfabriken GmbH. Apparatus for carrying and loading top-rollers in a drawing machine. 3,787,933, Cl. 19-267.000.

Davis, Delles T., to Development Research Ltd. Safety zone fuel system for mobile direct service units. 3,788,755, Cl. 404-1.000.

Davis, Ira K., to Fowler, Sam B. Cutting apparatus. 3,788,175, Cl. 83-83.000.

Davis, Loren Roger; and Kirkland, Walter Dean, to Cutter Laboratories, Inc. Additive container. 3,788,524, Cl. 222-209.000.

Davis, Robert Curtis: *See—*
Clark, George Cyril, Jr.; and Davis, Robert Curtis, 3,789,359.
Clark, George Cyril, Jr.; and Davis, Robert Curtis, 3,789,360.

Dawbarn, Henry D., to Thiokol Chemical Corporation. Tufted pile fabrics and backings therefor. 3,788,364, Cl. 139-420.00r.

Dawson, Clarence G., to FEI, Inc. Plastic wheel assembly for overhead conveyors. 3,787,925, Cl. 16-107.000.

Dawson, Theodore R. Container with cup liners and cup holders. 3,788,487, Cl. 211-49.00d.

De Angelis, Andrea Lucio. Method for the elimination and possible recovery of the floating polluting substances, mineral oils in particular, from sheets of water and boat fitted to this aim. 3,788,481, Cl. 210-242.000.

De Brick, Eric, to West Virginia Armature Company. Electrical coupling with pressure contacts and multiple conductance paths. 3,789,346, Cl. 339-89.00r.

De Bruyn, William T.: *See—*
Teggelaar, Claude; and De Bruyn, William T., 3,788,006.

De Cat, Arthur Henri: *See—*
Willems, Jozef Frans; Sels, Francis Jeanne; Pollet, Robert Joseph; and De Cat, Arthur Henri, 3,788,851.

De Cat, Arthur Henri; Sels, Francis Jeanne; Pollet, Robert Joseph; and Willems, Jozef Frans, to Agfa-Gevaert N.V. Surface-active compounds for use as coating aids for film-forming coating compositions. 3,788,850, Cl. 96-67.000.

De Hartog, Jan F., to Fokker-V.F.W. N.V. Open framework, especially for building purposes. 3,788,024, Cl. 52-648.000.

De Keyser, Richard A.: *See—*
Bailey, John M.; Kranc, Stanley J.; and De Keyser, Richard A., 3,788,546.

De Laval Turbine Inc.: *See—*
Rusak, Vasil, 3,788,765.

De Luca, Robert D., to Corning Glass Works. Ionic treatment of glass optical waveguide fibers. 3,788,827, Cl. 65-30.000.

De Ramis, Angelika Zankl: *See—*
Hagemann, Hermann; Pedain, Josef; and Zankl, Erich, 3,789,033.

De Stevens, George: *See—*
Carney, Richard William James; and De Stevens, George, 3,789,123.

DeClaire, James H.: *See—*
Gray, Thomas J.; DeClaire, James H.; and Tucker, Herbert D., 3,788,664.

Degioia, Peter A.; and Sutton, Charles B., to General Motors Corporation. Ball bearing with a unitary separator-seal. 3,788,714, Cl. 308-187.200.

Degremont Societe Generale d'Epuration et d'Assainissement: *See—*
Richard, Yves Robert; Le Roi, Marly; and Mignot, Jean Marcel, 3,788,981.

Dehne, Axel G., to Hughes Aircraft Company. Double acting expander ending and cryostat. 3,788,088, Cl. 62-6.000.

Deike, Robert F. Container anchor rack. 3,788,584, Cl. 248-154.000.

Delahunty, Terry Wayne, to Chicago Bridge & Iron Company. Dry type, liquid-solid cooling system. 3,788,385, Cl. 165-2.000.

Delphin, Pierre P.; and Peironet, Pierre R., to Thomson-CSF. Magnetic focusing device for an isochronous cyclotron. 3,789,335, Cl. 335-210.000.

Demag Aktiengesellschaft: *See—*
Nieboer, Pieter, 3,788,621.

Demaray, Merlin E., to Ranco, Incorporated. Multiple zone air conditioning system. 3,788,386, Cl. 165-2.000.

Dempsey, Edward Justing; Kent, David Earl; and Hudspeth, Patrick William, to Concrete Cutting Equipment, Incorporated. Work and feed control system for cutting machines. 3,789,279, Cl. 318-39.000.

Denker, James M., to Nutron Corporation. Fluid controlling. 3,788,339, Cl. 137-115.000.

Denki Kaguku Kogyo Kabushiki Kaisha: *See—*
Suzuki, Tadao, 3,788,792.

Denki Onkyo Co., Ltd.: *See—*
Masuda, Noboru, 3,789,311.

Denman, Robert R.: *See—*
Austin, Lewis M.; Denman, Robert R.; O'Donnell, Thomas P.; and Veres, Frank, 3,788,828.

Dennison, Scott C.: *See—*
Kilroy, Eugene J., Jr.; Du Breuil, Philip B.; and Dennison, Scott C., 3,787,998.

Dera, Alain Joseph: *See—*
Gelin, Jacques Andre; and Dera, Alain Joseph, 3,788,285.

Derragon, Don C., Jr. to Motor Coach Industries, Inc. Reverse balance flow valve assembly for refrigerant systems. 3,788,394, Cl. 165-134.000.

Derville, Denis, to Compagnie Internationale pour l'Informatique. Programme translation and reentrance device. 3,789,368, Cl. 340-172.500.

Design Dimension, Inc.: *See—*
Taylor, James F., 3,787,910.

Detig, Robert H., to Xerox Corporation. Fixing method utilizing intermediate heat transfer. 3,788,873, Cl. 117-21.000.

Deutsch Fastener Corporation: *See—*
Gulistan, Bulent, 3,788,123.

Development Research Ltd.: *See—*
Davis, Delles T., 3,788,755.

Devin, O. K., Inc.: *See—*
Leonhardt, Theodore C., 3,787,992.

Di Stefano, Vittorio, to Centro Sperimentale Metallurgico S.p.A. Quantitative analyzer for liquid-solid chromatography or for electrophoresis and method for its use. 3,788,969, Cl. 204-299.000.

Dia-Print Company, Inc., The: *See—*
Lambert, Daryl G., 3,788,216.
Lambert, Daryl Gene, 3,788,215.

Diamond Shamrock Corporation: *See—*
Faunce, John Porter, 3,788,839.
Schenker, Barry A.; Malkin, Irving; and Taylor, Kirman, 3,789,022.
Volgstadt, Frank R.; and Semancik, John R., 3,789,030.

Dick, A. B., Company: *See—*
Borneman, Lawrence A., 3,788,221.
Gallagher, John P., 3,788,219.
Laben, Wallace J.; and Tonkin, Kenneth J., 3,788,220.

Diebold, Incorporated: *See—*
Bornett, Charles B.; and Morrison, Larry A., 3,788,577.

Dieckman, Robert W.; Albers, Bernd G.; and Mrozek, John W., to Pennsylvania Engineering Corporation. Schnabel car. 3,788,237, Cl. 105-367.000.

Dieckmann, George W., Jr., to Food Equipment Corporation. Curved-path slat belt conveyor. 3,788,455, Cl. 198-182.000.

Diem, Rudolf, to SKF Kugellagerfabriken GmbH. Roller support and drive arrangement for roller testing devices. 3,787,983, Cl. 33-174.00q.

Diery, Helmut; Rittner, Siegbert; and Lorke, Horst, to Farbwerke Hoechst Aktiengesellschaft vormals Meister Lucius & Bruning. Metal working agents. 3,788,991, Cl. 252-33.600.

Dillenberg, Horst. Aqueous electrolytic stripping bath. 3,788,958, Cl. 204-146.000.

Dinger, Edward H.; and Stastor, Richard A., to General Electric Company. Voltage compensated phase shifting circuit. 3,789,291, Cl. 323-119.000.

Dinnerstein, Albert J.: *See—*
Willinger, Allan H.; and Dinnerstein, Albert J., 3,788,277.

Ditscheid, Hans Leo, to Felten & Guilleaume Aktiengesellschaft. Air-insulated coaxial high-frequency cable. 3,789,129, Cl. 174-28.000.

Dittrich, Werner: *See—*
Tschunt, Edgar; and Dittrich, Werner, 3,788,450.

Dixon, Earl; and Landry, Norman Richard, to United States of America, Navy. Ferrite microwave phase shifter with insertion phase modifying means. 3,789,330, Cl. 333-31.00a.

Dobo, Emerick J., to Monsanto Company. Orifice assembly for extruding low-viscosity melts. 3,788,786, Cl. 425-72.000.

Doepke, Donald G. H., to General Electric Company. Refuse compactor having a pivotally arranged ram face member. 3,788,212, Cl. 100-229.00a.

Doherty, Lewis S., II, to Doherty-Silentaire. Top discharge roof ventilator. 3,788,207, Cl. 98-42.000.

Doherty-Silentaire: *See—*
Doherty, Lewis S., II, 3,788,207.

Dokubo, Tomoji; Hashimoto, Kiyoshi; and Okada, Masaru, to Japan Exlan Company Limited. Producing multi-color dyed acrylic textile containing wool with acid, direct and cationic dyes. 3,788,805, Cl. 8-21.00a.

Dolbear, Geoffrey E.; and Nagee, John S., Jr., to Grace, W. R., & Co. Hydrocarbon cracking with both a zeolite and Pt-U-alumina in the matrix. 3,788,977, Cl. 208-120.000.

Domecki, Edward H. Shrimp splitting and cleaning apparatus. 3,787,928, Cl. 17-71.000.

Domer, John T., to Whirlpool Corporation. Oven door mounting means. 3,788,300, Cl. 126-21.00r.

Donaghy, James G.: *See—*
Cole, Raymond C.; Hittel, William C.; and Donaghy, James G., 3,789,098.

Donaldson, George R., to Universal Oil Products Company. Simultaneous production of aromatic hydrocarbons and isobutane. 3,788,975, Cl. 208-60.000.

Dondy, Morris, to Texaco Inc. Preparation of hydrocarbylamine salt of thiocyanic acid. 3,789,075, Cl. 260-583.00r.

Donner, Arno Sten. Combination muzzle-loading mortar barrel and projectile. 3,788,188, Cl. 89-1.00f.

Donofrio, Nicholas M.; and Kemerer, Douglas W., to International Business Machines Corporation. Monolithic memory sense amplifi-

er/bit driver having active bit/sense line pull-up. 3,789,243, Cl. 307-238.000.

Donoghue, Matthew J.: *See—*
Harper, Robert J., Jr.; Gautreaux, Gloria A.; Bruno, Joseph S.; and Donoghue, Matthew J., 3,788,804.

Donowitz, Howard; and O'Hara, William J. Surgical implant device. 3,788,327, Cl. 128-350.00r.

Doring, Gerhard, to Jenoptik Jena G.m.b.H. Device for rapid switching of inductors. 3,789,237, Cl. 307-104.000.

Dorma-Baubeschlag GmbH & Co., KG: *See—*
Jentsch, Dietrich, 3,787,924.

Dorr, Karl-Heinz; Grimm, Hugo; and Kola, Rolf, to Metallgesellschaft Aktiengesellschaft. Absorber for sulfur trioxide. 3,788,043, Cl. 55-237.000.

Dortenzo, Alexander T., to Pennsylvania Engineering Corporation. Steel converter vessel pollution control method and apparatus. 3,788,619, Cl. 266-13.000.

Dotco, Inc.: *See—*
Snider, Philip A., 3,788,603.

Douthitt, Merton H., to SCM Corporation. Apparatus for sorption of gas. 3,788,047, Cl. 55-387.000.

Dove, Harold Daniel. High dielectric electronic packaging material. 3,788,939, Cl. 161-93.000.

Dow Chemical Company, The: *See—*
Clarke, James A., 3,789,053.
Kropscott, Earle L.; and Wittenbach, Gerald R., 3,789,100.
Lane, Robert E., Jr., 3,789,063.

Dowty Hydraulic Units Limited: *See—*
Kempson, Bertram Carl; and Nicholls, James Andrew, 3,788,063.

Doyle, James H., to Master Specialties Company. Method for compressing and synthesizing a cyclic analog signal based upon half cycles. 3,789,144, Cl. 179-15.55t.

Dray, Robert F., to Feed Screws, Inc. Mixing element for extruder screw. 3,788,612, Cl. 259-182.000.

Dresser Industries, Inc.: *See—*
Dysart, Theodore R., 3,788,408.
Marsh, Barry T., 3,788,127.
Wilson, Billy Fred, 3,789,219.
Youmans, Arthur H., 3,789,217.

Drone, Gary A.; and Schnepp, James M., to Allis-Chalmers Corporation. Vehicle frame including radiator and fan mounting. 3,788,419, Cl. 180-68.00r.

Drop, Peter Cornelis: *See—*
Polman, Jan; Van der Werf, Jan Evert; and Drop, Peter Cornelis, 3,789,266.

Du Breuil, Philip B.: *See—*
Kilroy, Eugene J., Jr.; Du Breuil, Philip B.; and Dennison, Scott C., 3,787,998.

Du Pont de Nemours, E. I., and Company: *See—*
Bartlett, Philip Lee, 3,788,987.
Frenck, John Parsons, 3,788,962.
Hicks, George P.; and Updike, Stuart J., 3,788,950.
Hoeschele, Guenther Kurt, 3,789,032.
Incremona, Joseph H., 3,789,048.
Irani, Farhad A., 3,789,009.
Klopping, Hein L., 3,789,122.
Miller, Lester I., 3,789,037.
Pruckmayr, Gerfried, 3,789,047.
Rees, Richard Watkin; and Reinhardt, Hans-Georg, 3,789,051.
Schaefer, William Edward, 3,788,223.
Short, Oliver A., 3,788,833.
Stiles, Alvin B., 3,789,019.
Thompson, Darrell R., 3,788,996.

Dubourg, Jean, to Rhone-Poulenc S.A. Lubricant compositions for the cold shaping of metals. 3,788,988, Cl. 252-32.500.

Dukess, Joseph. Multiple compartment tube with resilient divider. 3,788,520, Cl. 222-94.000.

Dumoulin, Joseph; and Obsomer, Marc, to Solvay & Cie. Process for the preparation of vinyl chloride polymers grafted on polymers of ethylene. 3,789,083, Cl. 260-878.000.

Dumstorff, Eugene Francis; Iverson, John Howard; Schloss, Phillip Christian; and Wong, Philip Chock-Yueh, to International Business Machines Corporation. Memory access device. 3,789,367, Cl. 340-172.500.

Dunlavy, Alfred R. Hearing aid construction. 3,789,163, Cl. 179-107.00s.

Dunlop Limited: *See—*
Brown, William David; and Thomson, Richard Noel, 3,788,651.

Dunn, Kenneth H. Automatic firearm. 3,788,190, Cl. 89-196.000.

Dupre, John. Automatic saturation analysis. 3,788,812, Cl. 23-230.00b.

Durst, Jack R.; and Winters, William C., to Pillsbury Company, The. Hydromilling of wheat. 3,788,861, Cl. 426-385.000.

Dusseau, Andress: *See—*
Kim, Sung Soo; and Dusseau, Andress, 3,788,318.

Dyck, Gerhard, to Dyckes Sprinkler Co., Ltd. Stacked valve system. 3,788,344, Cl. 137-271.000.

Dyckes Sprinkler Co., Ltd.: *See—*
Dyck, Gerhard, 3,788,344.

Dye, John F., to Kendall Company, The. Spinal needle. 3,788,320, Cl. 128-221.000.

Dyna Magnetic Devices, Inc.: *See—*
Sebesta, George J., 3,789,166.

Dysart, Theodore R., to Dresser Industries, Inc. Rock bit water deflector and separator. 3,788,408, Cl. 175-337.000.

E-System, Inc.: *See—*
Bauer, George B.; and Thornberg, Dean S. (said Thornberg assor. to), 3,789,414.

Eannarino, Joseph M.; Granieri, Michael S., Jr.; and Michaelson, Henry W. Child-safe pill dispenser. 3,788,517, Cl. 221-154.000.

Earl, Allan E.: *See—*
Stewart, Graham G.; and Earl, Allan E., 3,788,910.

Eastman Kodak Company: *See—*
Gade, John N.; and MacKay, James D., 3,787,954.
Gilman, Paul B., Jr.; and Haefner, John A., 3,788,853.
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Mengel, Lloyd A., 3,788,519.
Meyer, Robert J.; and Westacott, Harry L., 3,788,349.
Stahly, Frederick August; and Merrill, Stewart Henry, 3,788,995.
Tuite, Robert J., 3,788,854.
Wroblewski, Richard J., 3,788,572.

Easton, Roger L. Navigation system using satellites and passive ranging techniques. 3,789,409, Cl. 343-112.00r.

Eberhard, Frank A. Hydrotherapy bath tub. 3,788,306, Cl. 128-66.000.

Ebert, Robert J. Shoe polishing machine. 3,787,918, Cl. 15-31.000.

Eden, Dayton D.: *See—*
Chivian, Jay S.; Claytor, Richard N.; and Eden, Dayton D., 3,789,421.
Claytor, Richard N.; and Eden, Dayton D., 3,789,420.

Edgar, William D.; Sustarsic, John D.; and Konzler, Roymond C., to Koppers Company, Inc. Coke quenching car. 3,788,236, Cl. 105-254.000.

Edwards, Gary S.: *See—*
Clifton, John R.; and Edwards, Gary S., 3,788,227.

Eff, Christian A., to General Electric Company. Domestic solid waste incinerator. 3,788,243, Cl. 110-8.00r.

Egawa, Hideharu: *See—*
Idei, Gijun; Onoyama, Atsushi; Aihara, Mitsuo; Suzuki, Seigo; Egawa, Hideharu; and Yamaga, Eiichi, 3,788,058.

E.G.O. Elektro-Gerate Blanc und Fischer: *See—*
Fischer, Karl; Gossler, Gerhard; and Kigherer, Robert, 3,789,189.

Ehrlich, Donald J., to Monon Trailer Inc. Trailer construction. 3,788,682, Cl. 296-28.00m.

Ehrlich, Stephen Jeffrey, to Black and Decker Manufacturing Company. Wheel mounting assembly for lawn and garden type tools and the like. 3,788,049, Cl. 56-16.900.

Eichelman, George H., Jr.: *See—*
Shapiro, Eugene; Crane, Jacob; and Eichelman, George H., Jr., 3,788,902.

Eichner, Fred N.; and Kocher, Leo F., to United States of America, Atomic Energy Commission. Environmental dosimeter of the thermo-luminescent type. 3,789,227, Cl. 250-484.000.

Eidt, Clarence M., Jr.: *See—*
Buchmann, Fred J.; Eidt, Clarence M., Jr.; Mason, Ralph B.; and Hamner, Glen P., 3,788,974.

Eikenberry, John N.: *See—*
Goering, Harlan L.; Eikenberry, John N.; and Koermer, Gerald S., 3,789,060.

Eiland, Ehrlich M., to Aluminium Company of America. Method for producing an opaque coating. 3,788,886, Cl. 117-132.0bf.

Elbe, Maximo, to Colorant Schmuckstein GmbH, Firma. Brilliant having plural rings of facets, each having an odd number of facets. 3,788,097, Cl. 63-32.000.

Elco Chemicals Inc.: *See—*
Young, David W., 3,789,008.

Elco Industries, Inc.: *See—*
Cutshall, Charles E., 3,788,185.

Electronic Associates, Inc.: *See—*
Embley, Ronald W., 3,789,309.

Electronique Marcel Dassault: *See—*
Bataille, Roger; Maison, Francois P.; and Curvale, Pierre Paul, 3,789,411.

Elkem A/S: *See—*
Flood, Hakon; and Seltveit, Arne, 3,788,866.

Elliott, Curtis H., Jr., to Grace, W. R., & Co. Process for producing crystalline zeolite. 3,789,107, Cl. 423-329.000.

Elliott, John Scotchford; Crail, Ian Robert Henry; and Askew, Herbert Frank. Lubricating compositions. 3,788,990, Cl. 252-33.400.

Elliott, Robert A.: *See—*
Kojiro, Katsuto; and Elliott, Robert A., 3,788,949.

Ellis, Richard D. Police utility bar. 3,789,358, Cl. 340-87.000.

Eltro GmbH & Company: *See—*
Menke, Franz, 3,788,745.

Elwick, Keith D., to Starling, Inc. Ground engaging hay bale rolling apparatus. 3,788,052, Cl. 56-341.000.

Embley, Ronald W., to Electronic Associates, Inc. Digital coefficient attenuator. 3,789,309, Cl. 328-169.000.

Emerson, William C., to Xerox Corporation. Chain bead drive apparatus. 3,788,454, Cl. 198-168.000.

Emhart Corporation: *See—*
Lattke, Horst G., 3,788,637.

Engelhorn, Robert: *See—*
Kruger, Gerd; Zipp, Otmar; Keck, Johannes; Nickl, Josef; Machleidt, Hans; Ohnacker, Gerhard; Engelhorn, Robert; and Puschmann, Sigfrid, 3,789,125.

Engels, Heinrich, to Siemens Aktiengesellschaft. Ring canal blower. 3,788,766, Cl. 415-531.000.
Engelsmann, Dieter: *See—*
Greiner, Joachim; Engelsmann, Dieter; Gersch, Josef; Landbrecht, Franz; Muller, Rudolf; Wenger, Wolfgang; and Wiedemann, Otto, 3,789,157.
Ensign Electronics, Inc.: *See—*
Forsyth, Eric B., 3,789,352.
Epperlein, Helmut; and Hoscheler, Edgar, to Holzapfel, Christian, K.G. Element for bridging the juncture between adjacent structural components. 3,788,022, Cl. 52-403.000.
ERCO Industries, Limited: *See—*
Rapson, William Howard, 3,789,108.
Ercoli, Alberto; and Gardi, Rinaldo, to Warner-Lambert Company. 17α,21-Orthobutyrates of 6α,9α-difluorohydrocortisone and 6α,9α-difluoroprednisolone, compositions containing same and the use thereof. 3,789,121, Cl. 424-241.000.
Erickson Tool Company: *See—*
Benjamin, Milton L.; Walker, David D.; and Miles, Wilbur N., 3,788,658.
Erst, Stephen J., to International Telephone and Telegraph Corporation. FM-CW radar range system. 3,789,398, Cl. 343-14.000.
Esso Production Research Company: *See—*
Matthews, Jamie F., Jr., 3,788,084.
Esso Research and Engineering Company: *See—*
Bearden, Roby, Jr.; MacMullin, Robert B.; Lewis, William E.; and Welty, Albert B., Jr., 3,788,978.
Buchmann, Fred J.; Eidt, Clarence M., Jr.; Mason, Ralph B.; and Hamner, Glen P., 3,788,974.
Camarasa, Mario; and Kraus, Bernhard Josef, 3,788,070.
Carter, James L.; and Sinfelt, John H., 3,789,020.
Henry, H. Clarke; Gilbert, John B.; and Sosnowski, John, 3,788,972.
Lewis, William E.; and Paynter, John D., 3,788,835.
Tauster, Samuel J., 3,789,025.
Etablissements Rousselet: *See—*
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Ethyl Corporation: *See—*
Hildreth, Clarence L., 3,788,834.
Lanier, Carroll W., 3,789,081.
Lehikoinen, U. Albert, 3,788,907.
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Wells, Ronald L., 3,788,823.
Ets J. J. Carnaud & Forges de Basse-Indre: *See—*
Bru, Michel, 3,788,639.
Evans, Brent R. Mathematical board game apparatus. 3,788,644, Cl. 273-134.0ad.
Evans, Clarence F. Fused igniting dispenser. 3,788,222, Cl. 102-37.004.
Evans, James W., to Athletic Swing Measurement, Inc. Swing measurement system. 3,788,647, Cl. 273-186.00a.
Evans, James W., to Athletic Swing Measurement, Inc. Three dimensional display system. 3,789,397, Cl. 343-7.900.
Evans Products Company: *See—*
Bennett, James R., 3,788,238.
Evans, Robert A.; and Brundage, Horace W., to Consolidated Foods Corporation. Vacuum cleaner suction tool with orbital nozzles for cleaning deep pile shag rugs. 3,787,920, Cl. 15-416.000.
Everlasting Valve Company: *See—*
Fitzgerald, Thomas W., 3,788,346.
EVG Entwicklungs- und Verwertungsgesellschaft m.b.H.: *See—*
Ritter, Josef; Gott, Hans; Ritter, Klaus; Gamillscheg, Otto; Boyer, Wilhelm; and Ritter, Gerhard, 3,788,122.
Ex-Cell-O Corporation: *See—*
Sutton, Robert S., 3,788,657.
Excelermatic, Inc.: *See—*
Kraus, Charles E., 3,788,713.
Fa. Hunnebeck GmbH: *See—*
Markewitz, Wolfgang; and Mischke, Fritz, 3,788,494.
Fachini, Robert M.; Kenna, Fenton L., Jr.; Barrett, Monroe C.; Nickla, Louis E.; and Graham, Robert L., to International Harvester Company. Automatic bale handling device. 3,788,495, Cl. 214-6.00b.
Fagersta Aktiebolag: *See—*
Loovist, Kaj Ragnar, 3,787,943.
Fahlman, Gosta H.; Lundborg, Gunnar; and Westberg, Johan Eric Hayden, to AGA Aktiebolag. Tubular diving equipment. 3,788,311, Cl. 128-142.300.
Fairchild Camera and Instrument Corporation: *See—*
Lehrer, William I., 3,788,723.
Fairchild Industries, Inc.: *See—*
Cortez, Edward, 3,789,361.
Falen, Walter S.; and Giardina, Anthony J., to General Motors Corporation. Fuel injection system. 3,788,287, Cl. 123-52.0mv.
Falkehag, Sten I.; and Braddon, David V., to Westvaco Corporation. Elastomer stabilization with lignin-based materials. 3,789,043, Cl. 260-17.500.
Falkehag, Sten, II; and Bailey, Carl W., III, to Westvaco Corporation. Dyestuff compositions containing sulfomethylated phenolic-formaldehyde resin dispersants stabilized with urea or ammonia. 3,788,808, Cl. 8-34.000.
Farbwerke Hoechst Aktiengesellschaft vormals Meister Lucius & Bruning: *See—*
Beiertz, Hans, 3,788,807.
Buttner, Gert; Hartmann, Adolf; and Braun, Peter, 3,789,031.
Diery, Helmut; Rittner, Siegbert; and Lorke, Horst, 3,788,991.
Heiskel, Elmar; and Last, Hartmut, 3,789,028.
Hille, Ernst; Hoyer, Ernst; Meininger, Fritz; and Rottmann, Johannes, 3,788,801.
Klatt, Peter; Seeger, Karl; and Wilborn, Wolfgang, 3,788,296.
Farian, Gerhard; and Fink, Willi, to Kaltenbach & Voigt. Dental handpiece of straight or angle type. 3,787,977, Cl. 32-27.000.
Farlow, Jan M., to Minnesota Mining and Manufacturing Company, mesne. Facsimile drive apparatus. 3,789,426, Cl. 346-138.000.
Farrington, Bob H. Fluorescent bulb handling apparatus. 3,788,693, Cl. 294-20.000.
Faunce, John Porter, to Diamond Shamrock Corporation. Method for incorporating metals into molten metal baths. 3,788,839, Cl. 75-93.00r.
Fawcett, Howard, to Cambridge Instrument Company, Inc. Direct writing recorder including an improved stylus assembly therefor. 3,789,423, Cl. 346-76.00r.
Fazzani, Raymond John, to Torrington, Company, The. Tailpipe forming mechanism. 3,788,116, Cl. 72-296.000.
Feather Hill Industries, Inc.: *See—*
Boehland, Robert R., Jr., 3,788,279.
Featherman, Daniel J., to Featherman, Fetherman and Fetherman. Erectible shelving. 3,788,490, Cl. 211-176.000.
Featherman, Fetherman and Fetherman: *See—*
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Federal Cartridge Corporation: *See—*
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Federal Tool & Plastics; a division of VCA Corporation: *See—*
Ostrowsky, Efrem M., 3,788,549.
Feed Screws, Inc.: *See—*
Dray, Robert F., 3,788,612.
FEI, Inc.: *See—*
Dawson, Clarence G., 3,787,925.
Feit, Louis; and Krause, Irving A., to International Telephone and Telegraph Corporation. Arrangement for synchronizing the recording of a plurality of signals an a recording medium. 3,789,159, Cl. 179-100.0zs.
Fejer, Mark E.: *See—*
Nesbitt, John D.; and Fejer, Mark E., 3,788,832.
Feldman, David W.; and Slone, James C., Jr., to United States of America, Navy. Guidance system. 3,789,351, Cl. 340-4.00r.
Feldmann, Robert G., to Pyroil Company, Inc. Windshield scraper. 3,787,921, Cl. 15-105.000.
Felten & Guilleaume Aktiengesellschaft: *See—*
Ditscheid, Hans Leo, 3,789,129.
Felthuis, Jacob: *See—*
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Fend, Fritz: *See—*
Stahl, Karl-Heinz; Stahl, Werner; and Fend, Fritz, 3,788,547.
Fensom, Harry William, to Post Office, The. Side-tone reducing circuit for a telephone subscribers instrument. 3,789,155, Cl. 179-81.00a.
Fernald, Robert A.: *See—*
Goldie, Charles H.; and Fernald, Robert A., 3,789,214.
Fernseh G.m.b.H.: *See—*
Bachmann, Horst, 3,789,135.
Ferranti Limited: *See—*
Hepburn, William Dunn, 3,789,320.
Ferrario, Franco. Conducting fluid type inertia responsive switch for motor vehicles. 3,789,170, Cl. 200-61.470.
Ferstenberg, Charles, to Tenneco Chemicals, Inc. Web transfer system. 3,788,535, Cl. 226-88.000.
Feuerbacher, David George; and Smith, Mary Kay Hrncir, to Texaco Inc. Method for inhibiting adsorption of surfactant in secondary oil recovery. 3,788,399, Cl. 166-274.000.
Fibreboard Corporation: *See—*
Baker, David R.; and Yin, Robert I., 3,788,876.
Fichtel & Sachs AG: *See—*
Koller, Manfred, 3,788,630.
Pfister, Bruno, 3,788,289.
Fichter KG, Firma: *See—*
Fichter, Roland, 3,788,777.
Fichter, Roland, to Fichter KG, Firma. Miniature electric fan. 3,788,777, Cl. 417-411.000.
Ficker, Stefan: *See—*
Kaeppler, Gerhard; Ficker, Stefan; and Pergande, Wilfried, 3,788,046.
Figari, Jorge Galvez. Process for collection and treatment of garbage. 3,788,027, Cl. 53-24.000.
Fillmore, Richard Plumb; and Heuner, Robert Charles, to RCA Corporation. Electronic firing circuit. 3,788,226, Cl. 102-70.20r.
Finch, Colin Maxwell: *See—*
Knight, Lindsay Charles; Finch, Colin Maxwell; Walden, Noel Harry Fred; and Racz, George, 3,788,748.
Fink, Werner: *See—*
Von Grunberg, Hubertus; Fink, Werner; and Kircher, Dieter, 3,788,710.
Fink, Willi: *See—*
Farian, Gerhard; and Fink, Willi, 3,787,977.
Finster, Leslie P.; Petkovsek, Richard J.; and Reader, Trevor D., to Cogar Corporation. Tape cartridge loading and positioning system. 3,788,571, Cl. 242-195.000.
Firth, Arthur Jose, 600 Machine Tools Limited. Trip device for use in a feed mechanism of a machine. 3,788,158, Cl. 74-412.0tl.
Fischer, Christopher L., to Raychem Corporation. Universally jointed chilling tool. 3,788,692, Cl. 294-19.00r.

Fischer, Karl; Gossler, Gerhard; and Kigherer, Robert, to E.G.O. Elektro-Gerate Blanc and Fischer. Electrical cooking appliance. 3,789,189, Cl. 219-464.000.
Fitzgerald, Thomas W., to Everlasting Valve Company. Flangeless valve. 3,788,346, Cl. 137-330.000.
Fitzky, Hans-Georg: *See*—
Nassenstein, Heinrich; and Fitzky, Hans-Georg, 3,788,728.
Fives Lille-Cail: *See*—
Postel-Vinay, Francis, 3,788,445.
Postel-Vinay, Francis, 3,788,446.
Fleischmann, Lewis W., to Westinghouse Electric Corporation. Flow control apparatus. 3,788,310, Cl. 128-142.000.
Flex-O-Lators, Inc.: *See*—
Foy, Charles L.; and Arnold, Harmon W., 3,787,922.
Flintkote Company, The: *See*—
Califano, Frank L.; and Laszlo, Joseph, 3,788,925.
Flood, Hakon; and Seltveit, Arne, to Elkem A/S. Method of producing refractory material. 3,788,866, Cl. 106-69.000.
Florjancic, Peter. Device for the framing of photographic slides. 3,788,031, Cl. 53-123.000.
Fluid Device Corporation: *See*—
Richards, George B., 3,788,090.
FMC Corporation: *See*—
Abbott, John A.; and Mencacci, Samuel A., 3,788,392.
Berkowitz, Sidney, 3,789,000.
Kraft, Robert E., 3,788,492.
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Pelmulder, John P.; Meister, Cornelius; and Monroe, Darrell W., 3,788,470.
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Stephanoff, Louis J., 3,788,447.
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Folkens, Dieter; and Moritz, Rolf, to Olympia Werke AG. Printing apparatus for business machines. 3,788,214, Cl. 101-96.000.
Folkesson, Bertil; Nilsson, Lennart; and Sjostrand, Uno, to Tetra Pak Developpment SA. Device for packing machines. 3,788,028, Cl. 53-51.000.
Food Equipment Corporation: *See*—
Dieckmann, George W., Jr., 3,788,455.
Ford Motor Company: *See*—
Bishop, Gerald B., 3,788,615.
Bozoian, Michael; Krugler, Allen D., Jr.; and Radin, Bernard G., 3,788,421.
Burger, Edgar P., 3,788,072.
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Colovas, Denny D.; Logan, John S.; and Skruch, Richard R., 3,788,233.
Harrison, Robert S.; and Lunsford, Max W., 3,788,288.
Holm, John A.; and Lapinski, David A., 3,789,269.
Macoit, Arthur J.; and Apostoleris, Theodore G., 3,789,250.
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Perkins, Norman W., 3,788,698.
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Toth, Steve, 3,788,295.
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Forsyth, Eric B., to Ensign Electronics, Inc. Method and apparatus for testing depth finders. 3,789,352, Cl. 340-5.00c.
Forward Technology Limited: *See*—
Allen, Gordon S. J., 3,789,259.
Foster, Robert E.: *See*—
Budd, Allan L.; Foster, Robert E.; and Greenberg, Jonathan S., 3,788,545.
Fowler, Ronald James; Freeh, Edward James; and Koenig, David Mark, to Industrial Nucleonics Corporation. Dryer control system and method. 3,787,985, Cl. 34-45.000.
Fowler, Sam B.: *See*—
Davis, Ira K., 3,788,175.
Fox, Everett D.; Schaefer, John P.; and Leliaert, Raymond M., to Wheelabrator-Frye Inc. Grease gun and coupling. 3,788,427, Cl. 184-105.00c.
Fox, Gary L.: *See*—
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Fox Industries, Inc.: *See*—
Scheffel, Carl W., 3,788,758.
Fox, William P. Hand-loaded pin chuck. 3,788,537, Cl. 227-142.000.
Foy, Charles L.; and Arnold, Harmon W., to Flex-O-Lators, Inc. Edge protector. 3,787,922, Cl. 16-1.000.
Frabill Manufacturing Co.: *See*—
Matras, Earl L.; Matras, Frank D.; and Herad, Donald J., 3,788,642.
Franklin Electric Subsidianes, Inc.: *See*—
Oxley, Arthur R., 3,788,411.
Franklin, Gerald: *See*—
Lehikoinen, U. Albert; and Franklin, Gerald, 3,788,908.
Frantzen, John J.; and Lund, Charles M., to Buckbee-Mears Company. System suitable for controlling etching without the aid of an etchant resistant. 3,788,912, Cl. 156-6.000.
Frappier, Robert H.; Tanner, Hal W., Jr.; and Wagers, William O., to International Paper Company. Method of making rolled edge scaled corrugated paperboard. 3,788,920, Cl. 156-202.000.
Freedman Artcraft Engineering Corporation: *See*—
Hosmer, Max E., 3,788,717.
Freedman, Norman S., granted to United States Atomic Energy Commission under the provision of 42 U.S.C. 2182; Horsting, Carel W.; Lawrence, Walter F.; and Carrona, John J. Thermo-electric modular structure and method of making same. 3,787,958, Cl. 29-472.30.
Freeh, Edward James: *See*—
Fowler, Ronald James; Freeh, Edward James; and Koenig, David Mark, 3,787,985.
Freewater, Milton: *See*—
Hiatt, Frank S.; and Freewater, Milton, 3,788,268.
Freeze, John A., to Westinghouse Electric Corporation. Electrical current monitor which separately indicates individual and sustained current pulses. 3,789,293, Cl. 324-51.000.
Frenck, John Parsons, to Du Pont de Nemours, E. I., and Company. Apparatus for monitoring the corrosion rate of metal by the polarization resistance method. 3,788,962, Cl. 204-195.00c.
Freund Inc. Co., Ltd.: *See*—
Tsujino, Takuichi, 3,789,117.
Frick, Heinrich; Halder, Niklaus; and Vogler, Willy, to Hoffmann-La Roche Inc. Method for producing chromanols. 3,789,086, Cl. 260-345.500.
Fried, David W., to Millar Elevator Industries, Inc. Elevator safety control circuit for preventing elevator door from opening at floor with fire. 3,788,428, Cl. 187-29.00r.
Fried. Krupp Gesellschaft mit beschrankter Haftung: *See*—
Lingemann, Heinz, 3,788,210.
Friedman, Harry G., to Medtronic, Inc. Body implantable lead. 3,788,329, Cl. 128-418.000.
Friedman, Mitchell; Kamentsky, Louis A.; and Klinger, Isaac, to Bio/Physics Systems, Inc. Method and apparatus for photoanalysis. 3,788,744, Cl. 356-39.000.
Friedman, Moshe; and Herndon, Melvin, to United States of America, Navy. Coherent microwave generators. 3,789,257, Cl. 315-3.000.
Fries, William, to Rohm & Haas Company. Selective separation of cyanide from waste streams by adsorption process. 3,788,983, Cl. 210-28.000.
Friesen, Theodore. Self-cleaning endless belt. 3,788,461, Cl. 198-229.000.
Fritz, Albert W., Jr. Safety apparatus for dump trucks. 3,789,357, Cl. 340-53.000.
Fritz, William Baird; Tiley, John Wayne; and Sanders, Neil Harrison, to AMP Incorporated. RF filters with glass on a substrate. 3,789,263, Cl. 315-39.510.
Frolich, Martin. Leak detector. 3,789,297, Cl. 324-65.00r.
Fuchs, Franz: *See*—
Dausch, Ernst; Kubler, Friedrich; Hempel, Theodor; and Fuchs, Franz, 3,787,933.
Fuji Electrochemical Co. Ltd.: *See*—
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Fuji Photo Film Co., Ltd.: *See*—
Honjo, Satoru; and Fukushima, Osamu, 3,788,930.
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Nakazawa, Yoshiyuki; Nakamura, Yoshuharu; Sueyoshi, Tohru; and Sato, Akira, 3,788,859.
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Gabriel, Frank K., to Westinghouse Electric Corporation. Interstage disc cavity removable temperature probe. 3,788,143, Cl. 73-346.000.
Gade, John N.; and MacKay, James D., to Eastman Kodak Company. Scroll winding and loading method. 3,787,954, Cl. 29-430.000.

Gadelius, Gustaf Shiro, to Gadelius Inter S.A. Method and apparatus for manufacturing reinforced plastic cylinders. 3,788,916, Cl. 156-74.000.
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Gallagher, John P., to Dick, A. B., Company. Blade for scraping liquids from a relatively moving surface. 3,788,219, Cl. 101-425.000.
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Gardner, Lloyd E., to Phillips Petroleum Company. Hydrodehalogenation catalyst. 3,789,016, Cl. 252-437.000.
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Garrett, Carl Eugene; Kinsley, William Henry, Jr.; and Moody, Larry Dean, to Western Electric Company, Incorporated. Methods of manufacturing waterproof cable. 3,789,099, Cl. 264-174.000.
Garrison, Judd F.; and Batts, John H., to Batts, John Thomas, Inc. Slack, tie and coat hanger. 3,788,488, Cl. 211-123.000.
Garzia, Aldo, to Istituto Chemioterapico Italiano S.p.A. Prophylaxis and treatment of cardiac 3,4,5-trialkoxyphenylalkanoic acids and salts thereof. 3,789,070, Cl. 260-521.00r.
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Geisel, Charles E., to Container Corporation of America. Caulking cartridge filling and seaming machine. 3,788,035, Cl. 53-282.000.
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George, Lyle R. Trailer hitch. 3,788,673, Cl. 280-423.00r.
George, Nicholas, to California Institute of Technology. Laser receiver system. 3,788,743, Cl. 356-28.000.
George, Nicholas. Image quality rating system. 3,788,749, Cl. 356-239.000.
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Giacoma, Frederick Alfred, Jr.; Godbold, Channing W.; and Stephens, Richard Wilson, to Monsanto Company. Explosion relief cover restraint. 3,788,514, Cl. 220-89.00a.

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Gibson, Ivan A. Cooling shroud for airboat. 3,788,264, Cl. 115-1.00r.

Gidon, Marie-Claire: *See—*
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Giesselmann, Gunter; Schreyer, Gerd; and Weigert, Wolfgang Deutsche Gold- und Silber-Scheideanstalt vormals Roessler. Process for the production of hydrogen peroxide by the anthraquinone process. 3,789,114, Cl. 423-588.000.

Gilbert, John B.: *See—*
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Gillette, Deighton D., to Iowa State University Research Foundation, Inc. System for exchanging blood ultrafiltrate. 3,788,319, Cl. 128-214.00b.

Gilman, Paul B., Jr.; and Haefner, John A., to Eastman Kodak Company. Photographic elements comprising complexes of titanium dioxide and an organic ligand. 3,788,853, Cl. 96-69.000.

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Girard, Rene Fernand Victor; and Gidon, Marie-Claire, to Societe Industrielle Bull-General Electric (Societe Anonyme). Process for treating substrates in order to reduce the magnetic angular dispersion of thin ferromagnetic films deposited on such substrats. 3,788,897, Cl. 117-236.000.

Gitlitz, Melvin H.: *See—*
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GK Systems, Inc.: *See—*
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Glasa, Stefan. Ink Cartridge for tubular writing pen. 3,788,754, Cl. 401-135.000.

Glass, Earl M., to Johnson, Howard, Company. Clam slicing machine. 3,788,176, Cl. 83-114.000.

Glass, Marvin, & Associates: *See—*
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Glass, William H.; and Bridigum, Robert J., to Westinghouse Air Brake Company. Combined air and hydraulic fluid supply apparatus and control therefor. 3,788,769, Cl. 417-26.000.

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Godfrey, Richard Hugh, to RCA Corporation. Methods of manufacture of color picture tubes. 3,788,847, Cl. 96-36.100.

Godin, Thomas J., to Coulter Electronics, Inc. Inline fluid filter. 3,788,484, Cl. 210-447.000.

Goebbels, Wolfgang: *See—*
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Goehle, Rolf; Velten, Walter; and Knirsch, Gunther, to Brown, Boveri & Cie Aktiengesellschaft. Electric protective switch for protection against fault currents, excess currents and short circuits. 3,789,334, Cl. 335-173.000.

Goering, Harlan L.; Eikenberry, John N.; and Koermer, Gerald S., to Wisconsin Alumni Research Foundation. Fluorinated camphor derivatives and europium and praseodymium chelates thereof. 3,789,060, Cl. 260-429.200.

Goetz, Philip J.; and Solomon, Leon R., to Singer Company, The. Sine-cosine frequency tracker. 3,789,316, Cl. 331-12.000.

Goff, James R., to Nelson, Robert T. Apparatus for treatment of vertically disposed surfaces. 3,788,010, Cl. 51-9.000.

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Campbell, Roger G., Sr.; Goff, Richard E., Jr.; and Guay, Normand D., 3,788,366.

Goldblatt, Maxwell; and McInteer, Berthus B., to United States of America, Atomic Energy Commission. Highly enriched multiply labeled stable isotopic compounds as atmospheric tracers. 3,788,814, Cl. 23-232.00r.

Goldie, Charles H.; and Fernald, Robert A., to United States of America, Atomic Energy Commission. Irradiation apparatus. 3,789,214, Cl. 250-354.000.

Gomer, William T.: *See—*
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Goodman, James W., Jr. Easily adjustable protective head gear. 3,787,894, Cl. 2-3.00r.

Goodrich, B. F., Company, The: *See—*
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Goransson, Nils Paul, to Saab-Scania Aktiebolag. Velocity flowmeter. 3,788,142, Cl. 73-230.000.

Gordin, Myron K., to G & L Industries, Inc. Retractible magnet holder. 3,789,336, Cl. 335-285.000.

Goretta, Louis A.: *See—*
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Grace, Garland K.: *See—*
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Grace, W. R., & Co.: *See—*
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Triggiani, Leonard V.; and Sanchez, Moises G., 3,789,013.

Graff, Eugene A.; and Heytmeijer, Herman R., to Westinghouse Electric Corporation. Yttrium phosphate vanadate phosphor. 3,789,014, Cl. 252-301.40p.

Graffman, Johan Holger. Injection nozzle for liquid fuel. 3,788,559, Cl. 239-533.000.

Graham, Robert L.: *See—*
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Granger, Alain; and Sausse, Andre, to Rhone-Poulenc S.A. Apparatus for concentrating a liquid containing non-ultrafiltrable elements. 3,788,474, Cl. 210-137.000.

Granieri, Michael S., Jr.: *See—*
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Gras, Georges: *See—*
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Graves, Richard A., to U-Line Corporation. Combination ice cube maker and refrigerator. 3,788,089, Cl. 62-137.000.

Gray, Thomas J.; DeClaire, James H.; and Tucker, Herbert D., to General Motors Corporation. Shoulder belt storage retainer. 3,788,664, Cl. 280-150.0sb.

Green, Donald T.; and Snarr, James L., to Imagex, Inc. X-ray tire inspection machine. 3,789,226, Cl. 250-360.000.

Greenberg, Jonathan S.: *See—*
Budd, Allan L.; Foster, Robert E.; and Greenberg, Jonathan S., 3,788,545.

Greenlay, Charles A.; and Andreas, Ehrhardt, to Hazemag Hartzerkleinerungs- und Zement-Maschinenbau Gesellschaft m.b.H. Recovery of asbestos fibers from asbestos ore. 3,788,562, Cl. 241-4.000.

Greenleaf, Allen H., to Itek Corporation. Multielement window. 3,788,730, Cl. 350-179.000.

Greenleaf, Jack T., to General Motors Corporation. Process for manufacturing curved channeled members. 3,787,960, Cl. 29-477.000.

Greenview Manufacturing Company: *See—*
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Gregori, Werner K. H., to Roher-Bohm Limited. Foamed plastic concrete form with fire resistant tension member. 3,788,020, Cl. 52-309.000.

Gregory, Robert B., to GK Systems, Inc. Mixing section for extruder feed screw. 3,788,614, Cl. 259-191.000.

Greiner, Joachim; Engelsmann, Dieter; Gersch, Josef; Landbrecht, Franz; Muller, Rudolf; Wenger, Wolfgang; and Wiedemann, Otto. Shielding device for overlapping the front face of a magnetic head in magnetic tape cartridges of the compact cassette type. 3,78,157, Cl. 179-100.20z.

Grieshaber, Otto A.: *See—*
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Griffith, David B. Filter means. 3,788,330, Cl. 131-10.500.

Griffith, Terry L.: *See—*
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Grimm, Hugo: *See—*
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Grimmer, Jon M.: *See—*
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Groh, Gunther; and Tiemens, Ulf, to U.S. Philips Corporation. Producing images of parts of an object which lie at different depths by means of holographic tomography. 3,788,726, Cl. 350-3.500.

Grosholz, Rainer: *See—*
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Gross, Edward F. Device for joining canvas boards. 3,787,934, Cl. 24-85.00r.

Grunert, Hellmuth, to Prameta Prazisionsmetall- und Kunststofferzeugnisse G. Baumann & Co. Boring device to fasten hinge frames or the like. 3,788,759, Cl. 408-115.000.

GTE Automatic Electric Laboratories Incorporated: *See*—
Jacobs, Melvin A.; and Woodward, John W., 3,789,150.
Jameel, Khaja M.; and Mueller, Von W., 3,789,332.
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GTE Sylvania, Incorporated: *See*—
Hough, Harold L.; and Wierzbicki, Julian J., 3,788,560.
Szeverenyi, Nikolaus A.; and Thompson, David F., 3,789,338.

Guallo, Maxime, to Ateliers Diederichs. Weft needle head of shuttleless loom. 3,788,360, Cl. 139-122.00n.

Guay, Normand D.: *See*—
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Gueniat, Robert: *See*—
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Guise, Frank, to Binks-Bullows, Limited. Liquid spraying apparatus. 3,788,554, Cl. 239-332.000.

Gulf & Western Industries, Inc.: *See*—
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Gulf Research & Development Company: *See*—
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Gulistan, Bulent, to Deutsch Fastener Corporation. Flaring tool. 3,788,123, Cl. 72-391.000.

Gulla, Michael, to Shipley Company, Inc. Regeneration of spent etchant. 3,788,915, Cl. 156-19.000.

Gumbelevicius, John, to McDonnell Douglas Corporation. Chemical milling of titanium, refractory metals and their alloys. 3,788,914, Cl. 156-18.000.

Gundrum, Ralph J.: *See*—
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Guntrum, William E.; Pexton, Harold W.; and Shores, Michael P., to Honeywell Information Systems, Inc. Method of fabricating a multihead magnetic transducer assembly. 3,787,963, Cl. 29-603.000.

Guth, Lauren W., to General Electric Company. Single hose coupling system. 3,788,347, Cl. 137-355.170.

Haagensen, Duane B., to Matsushita Electric Industrial Co., Ltd. Microwave oven with premixing of wave energy before delivery to its heating cavity. 3,789,179, Cl. 219-10.550.

Haak, Gunter, to Union Special Maschinenfabrik G.m.b.H. Multistage device for the control of the air supply for pneumatic aligning members. 3,788,251, Cl. 112-252.000.

Haberle, Wilhelm. Device for producing a swivelling motion in a linearly moving member. 3,788,154, Cl. 74-99.000.

Haberll, Wilhelm. Coupling. 3,788,434, Cl. 192-26.000.

Haefner, John A.: *See*—
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Hagedorn, Erwin C.: *See*—
Babcock, Clarence L.; Busdiecker, Robert A.; and Hagedorn, Erwin C., 3,788,865.

Hagemann, Hermann; Pedain, Josef; and Zankl, Erich; deceased (by Zankl, Helga; Zankl, Walter; and De Ramis, Angelika Zankl; heirs). Polyurethanes based on aryloxycarbonylisocyanates. 3,789,033, Cl. 260-77.5tb.

Hager, C., & Sons Hinge Manufacturing Co.: *See*—
Peterson, Francis C., 3,787,923.

Hager, Robert Bonner: *See*—
La Lande, William Alfred, Jr.; Hauptschein, Murray; and Hager, Robert Bonner, 3,789,088.

Hahn, Inc.: *See*—
Sorenson, Charles E.; and Grimmer, Jon M., 3,788,416.

Hair, George R.: *See*—
Hefernan, William; Hair, George R.; and Nielsen, John G., 3,788,032.

Haith, Marshall M.; and Lentz, Robert A. Electronic system for viewer response to television program stimuli. 3,789,136, Cl. 178-5.80r.

Halbach & Braun: *See*—
Braun, Gert; and Braun, Ernst, 3,788,458.

Halcon International, Inc.: *See*—
Kollar, John, 3,789,065.

Halder, Niklaus: *See*—
Frick, Heinrich; Halder, Niklaus; and Vogler, Willy, 3,789,086.

Hale, James C., to Victor Complometer Corporation. Compressed gas gun with trigger operated hammer release latching structures. 3,788,298, Cl. 124-11.00r.

Hall, Glen Henry. Article handling system. 3,788,694, Cl. 294-67.0bc.

Hall, Richard W., to American Cystoscope Makers Inc. Orthogonally deflectable endoscope. 3,788,303, Cl. 128-4.000.

Ham, Donald M., to General Electric Company. Demand meter with self-aligning bearing assembly. 3,789,300, Cl. 324-103.00r.

Hammar, Algot P. Tool for removing insulation from electrical wires. 3,787,969, Cl. 30-140.000.

Hammerschlag, Robert Hendrik. Apparatus for defining continually the envelope of the maxima, the minima and/or modulation depth of a varying input signal. 3,789,306, Cl. 328-150.000.

Hammond, Fred H., Jr., to Kendall Company, The, mesne. Peel adhesion apparatus and method. 3,788,135, Cl. 73-150.00a.

Hamner, Glen P.: *See*—
Buchmann, Fred J.; Eidt, Clarence M., Jr.; Mason, Ralph B.; and Hamner, Glen P., 3,788,974.

Handa, Minoru: *See*—
Ichihara, Koji; Tanaka, Hideki; Ishida, Kazutaka; and Handa, Minoru, 3,789,408.

Handke, Siegfried: *See*—
Beier, Helmut; Handke, Siegfried; and Konczal, Wolfgang, 3,789,175.

Handotai Kenkyu Shinkokai: *See*—
Nishizawa, Junichi, 3,789,285.

Hansen, Paul Bernard: *See*—
Brock, Robert James; Hansen, Paul Bernard; and Wilson, John C., 3,788,936.

Hanson, William J., to Xerox Corporation. Magnetic shielding apparatus. 3,788,275, Cl. 118-637.000.

Hara, Hajime: *See*—
Otsuki, Yutaka; Hara, Hajime; and Imai, Nobuo, 3,789,090.

Haraszti, Tegze; and Grosholz, Rainer, to Licentia Patent-Verwaltungs-G.m.b.H. Method of producing an integrated solid state circuit. 3,788,904, Cl. 148-186.000.

Hare, Thomas R.; and Segerstrom, Clifford C., to Shell Oil Company. Particulate solids tube loading apparatus. 3,788,370, Cl. 141-125.000.

Harenberg, Harold L., Jr.; and Shannon, James H., to McDonnell Douglas Corporation. Monitor display means. 3,789,356, Cl. 340-27.0na.

Harhen, Paul F., to Sage Laboratories, Inc. Microwave heating apparatus. 3,789,178, Cl. 219-10.550.

Harney, Ralph P., to Oak Industries Inc. Selective coding system for subscription television. 3,789,131, Cl. 178-5.100.

Harper, Robert J., Jr.; Gautreaux, Gloria A.; Bruno, Joseph S.; and Donoghue, Matthew J., to United States of America, Agriculture. Process for dyeing durable press cellulosic fabric with basic dyes. 3,788,804, Cl. 8-18.000.

Harrico Developments Limited: *See*—
True, Harry Edward, 3,788,106.

Harris, William H. Oyster handling apparatus. 3,788,448, Cl. 198-56.000.

Harris-Intertype Corporation: *See*—
Clark, George Cyril, Jr.; and Davis, Robert Curtis, 3,789,359.
Clark, George Cyril, Jr.; and Davis, Robert Curtis, 3,789,360.

Harris-Intertype Corporation, mesne: *See*—
Rosa, Jack; and Bartlett, Homer E., 3,789,407.

Harrison, David; and Sainz, Paul R., to Ransburg Electro Coating Corporation. Apparatus for projecting plural component material upon a suitable base. 3,788,555, Cl. 239-336.000.

Harrison, Robert S.; and Lunsford, Max W., to Ford Motor Company. Carburetor throttle valve positioner. 3,788,288, Cl. 123-97.00b.

Hart, Cullen P.; and Rosenberger, Paul C., to Caterpillar Tractor Company. Speed responsive locking differential. 3,788,166, Cl. 74-710.500.

Hartling, Donald C.: *See*—
Ayton, Ian F.; Hartling, Donald C.; Kossoff, Joseph; and Osborne, Brian G., 3,787,999.

Hartman, Cornelis, to Ballast-Nedam Groep N.V. Device for analysing the grain classification of a soil sample. 3,788,146, Cl. 73-432.00r.

Hartmann, Adolf: *See*—
Buttner, Gert; Hartmann, Adolf; and Braun, Peter, 3,789,031.

Hartness, Robert G.: *See*—
Hartness, Thomas P.; and Hartness, Robert G., 3,788,034.

Hartness, Thomas P.; and Hartness, Robert G. Grid set for an article loading machine. 3,788,034, Cl. 53-248.000.

Harz, Hermann, to Siemens Aktiengesellschaft. Arrangement for preventing chattering and scoring of direct-current slip-ring brushes. 3,789,282, Cl. 318-190.000.

Hashimoto, Hiroshi; and Matsumura, Toshio, to Kabushiki Kaisha Hattori Tokeiten. Non-magnetic composite having a constant modulus of elasticity. 3,788,822, Cl. 29-196.100.

Hashimoto, Kiyoshi: *See*—
Dokubo, Tomoji; Hashimoto, Kiyoshi; and Okada, Masaru, 3,788,805.

Haskell, John W.; and Isao, Sherman H. M., to International Business Machines Corporation. Ink drop coupling capacitance compensation. 3,789,422, Cl. 346-75.000.

Hassel, Ernst; and Schmenn, Adolf, to Schaefer, Fritz, GmbH. Shelving units. 3,788,242, Cl. 108-111.000.

Hasselbach, Arthur, to Beta Crafts, Incorporated. Molding apparatus. 3,788,590, Cl. 249-95.000.

Hastings Fiber Glass Products, Inc.: *See*—
McMullen, Earl Wayne, 3,788,691.

Hatakeyama, Shigeyuki: *See*—
Sato, Wasuke; Iriko, Fumio; Yamamoto, Sadao; Fujisawa, Mitsumaro; and Hatakeyama, Shigeyuki, 3,788,199.

Hathaway, John G., to General Motors Corporation. Grommet sealing arrangement. 3,788,655, Cl. 277-212.00f.

Hattori, Kenichi: *See*—
Kitsuda, Toshiyuki; Yamakawa, Choji; and Hattori, Kenichi, 3,788,868.

Hattori, Saburo; and Imaki, Naoshi, to Mitsubishi Chemical Industries, Ltd. Process for producing acyloxydodecatrienes. 3,789,066, Cl. 260-497.00a.

Hauptschein, Murray: *See*—
La Lande, William Alfred, Jr.; Hauptschein, Murray; and Hager, Robert Bonner, 3,789,088.

Haussman, Gerhard; and Schulz, Gunter, to Zinser-Tertilmaschinen Gesellschaft mit beschrankter Haftung. Apparatus for transporting and storing yarn pirns or the like. 3,788,054, Cl. 57-34.00r.

Hawkins, Robert D. System for driving heat motor. 3,788,064, Cl. 60-36.000.

Hawley Manufacturing Corporation: *See*—
Brumett, Billy M., 3,788,208.

Hawthorne, Vaughn I.; and Lundstrom, Ronald H., to Keystone Industries, Inc. Coupler centering draft gear. 3,788,493, Cl. 213-20.000.

Hay, Leon, to L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude. Process for purifying gas mixtures containing particularly CO as impurity. 3,789,106, Cl. 423-247.000.

Hayashi, Toshio: *See*—
Loseries, Peter; and Hayashi, Toshio, 3,788,204.

Hayashibara Company: *See*—
Kurimoto, Masashi; and Yoshida, Mikihiko, 3,788,946.

Hayden, Arthur G. Vapor detector safety system. 3,789,231, Cl. 307-9.000.

Hayden, Donald F.: *See*—
Kronoff, Clarence R.; and Hayden, Donald F., 3,788,361.

Hayes, Robert L.: *See*—
Gould, Joseph C.; and Hayes, Robert L., 3,788,475.

Hazelett, Earl T., Jr., to Continental Homes, Inc. Method for forming a flanged concrete panel having a planer central section. 3,789,102, Cl. 264-295.000.

Hazemag Hartzerkleinerungs- und Zement-Maschinenbau Gesellschaft m.b.H.: *See*—
Greenlay, Charles A.; and Andreas, Ehrhardt, 3,788,562.

Heanue, Paul T., to Lipe Rollway Corporation. Bar excursion controller. 3,787,914, Cl. 10-162.500.

Heberlein & Co. AG: *See*—
Burri, Hans, 3,788,056.

Hechenbleikner, Ingenuin A.; Hussar, John F.; Koeniger, Arthur F.; and Pressler, Robert L., to Cincinnati Milacron Chemicals Inc. Sulfur-containing esters of substituted hydroxyphenylalkanoic acids. 3,789,064, Cl. 260-473.00s.

Heckathorn, Loyd E., to Towner Manufacturing Company. Trencher with adjustable stabilizer bar. 3,787,989, Cl. 37-90.000.

Heckman, Gertrude E. Shower with oil reservoir. 3,788,553, Cl. 239-315.000.

Heeren, Richard H., to Teletype Corporation. Signal boost for shift register. 3,789,239, Cl. 307-221.00c.

Hefernan, William; Hair, George R.; and Nielsen, John G., to International Inpak Incorporated. Method and apparatus for forming article-holding display packages. 3,788,032, Cl. 53-141.000.

Hegeler, Wilhelm: *See*—
Prolss, Hans; and Hegeler, Wilhelm, 3,789,362.

Hehl, Karl. Injection molding machine. 3,788,788, Cl. 425-192.000.

Hehl, Karl. Clamping unit with a turning plate for an injection molding machine. 3,788,794, Cl. 425-450.000.

Heid, Christian; and Heinrich, Ernst, to Cassella Farbwerke Mainkur Aktiengesellschaft. Mixtures of 1-aminoanthraquinone-3,4-(N)-benzacridone dyestuffs and process for dyeing polyester fibers therewith. 3,788,806, Cl. 8-25.000.

Heidel, Klaus, to Chemische Werke Huls A.G. Aqueous air-and oven-drying coating compositions. 3,789,046, Cl. 260-23.70a.

Heightley, John Donnell, to Bell Telephone Laboratories, Incorporated. Threshold logic overflow detector for a three-input adder. 3,789,206, Cl. 235-172.000.

Heim Universal Corporation: *See*—
McCloskey, Albert R., 3,788,708.

Heinrich, Ernst: *See*—
Heid, Christian; and Heinrich, Ernst, 3,788,806.

Heiskel, Elmar; and Last, Hartmut, to Farbwerke Hoechst Aktiengesellschaft vormals Meister Lucius & Bruning. Coated foamable styrene polymer particles. 3,789,028, Cl. 260-2.50b.

Heitmann, Hans-Gunter; and Kelp, Fritz, to Kraftwerk Union Aktiengesellschaft. Steam power plant, especially with a boiling water nuclear reactor. 3,788,068, Cl. 60-106.000.

Held, Manfred, to Messerschmitt-Bolkow-Blohm Gesellschaft mit beschrankter Haftung. Warhead, particularly for fighting ships. 3,788,225, Cl. 102-56.000.

Heller, Lawrence G.; and Vogel, Norbert G., Jr., to International Business Machines Corporation. Threshold independent linear amplifier. 3,789,312, Cl. 330-35.000.

Helwig, Lawrence E.; and Murray, Michael V., to United States Steel Corporation. Method for producing adherent, ductile zinc coating on ferrous substrates by vacuum deposition. 3,788,877, Cl. 117-62.000.

Hemmelsbach, Richard J., to Space Age Industries, Inc. Anchor means for portable building structure. 3,788,335, Cl. 135-1.00r.

Hempel, Theodor: *See*—
Dausch, Ernst; Kubler, Friedrich; Hempel, Theodor; and Fuchs, Franz, 3,787,933.

Henkel & Cie G.m.b.H.: *See*—
Weber, Rudolf; and Upgenoorth, Angelika, 3,789,002.

Henry, H. Clarke; Gilbert, John B.; and Sosnowski, John, to Esso Research and Engineering Company. Process for the manufacture of lubricating oils by hydrocarcking. 3,788,972, Cl. 208-59.000.

Henry, Jules: *See*—
LeComte, Bernard; Henry, Jules; and Pincemin, Roger, 3,787,913.

Hensley, Ralph T.: *See*—
Thomson, John Ira; and Hensley, Ralph T., 3,788,573.

Henson, Alfred J.; and Lewis, Richard W., to Boeing Company, The. Vehicle location monitoring system. 3,789,198, Cl. 235-150.270.

Hentsch, Helmut O., to Continental Can Company, Inc. Control temperature blow stick for injection mold apparatus. 3,788,548, Cl. 239-132.300.

Hepburn, William Dunn, to Ferranti Limited. Gas laser circulation system. 3,789,320, Cl. 331-94.500.

Herad, Donald J.: *See*—
Matras, Earl L.; Matras, Frank D.; and Herad, Donald J., 3,788,642.

Herb, Raymond G., to National Electrostatics Corporation. Beam scanner. 3,789,298, Cl. 324-71.0eb.

Hercules Incorporated: *See*—
Batdorf, Jack B.; and Weiss, Steven M., 3,788,869.

Herman, Daniel F.: *See*—
Simone, Dominic; and Herman, Daniel F., 3,789,039.

Herndon, Melvin: *See*—
Friedman, Moshe; and Herndon, Melvin, 3,789,257.

Herschler, Michael G.: *See*—
Post, Roger L.; and Herschler, Michael G., 3,788,776.

Herubel, Jean Frederic, to Schlomberger, N., & Cie Guebwiller. Comb for textile machine. 3,787,931, Cl. 19-129.00r.

Hess, William Emil, Jr., to Bell Telephone Laboratories, Incorporated. Electronic pulse amplifier circuits. 3,789,241, Cl. 307-255.000.

Heuner, Robert Charles: *See*—
Fillmore, Richard Plumb; and Heuner, Robert Charles, 3,788,226.

Heusser, Eduard, to Zellweger Ltd. Textile-testing apparatus for measuring the cross-section of yarns rovings and slivers and particularly for detecting fluctuations in cross-section. 3,788,138, Cl. 73-160.000.

Hewlett-Packard Company: *See*—
Baldwin, Richard R.; and Rule, Bruce J., 3,788,746.

Hewson, Kenneth E.: *See*—
Sutton, Lawrence R.; Ranno, Carl P.; and Hewson, Kenneth E., 3,787,971.

Heyl & Co., Chem.-Pharm. Fabrik: *See*—
Kludas, Martin, 3,789,124.

Heytmeijer, Herman R.: *See*—
Graff, Eugene A.; and Heytmeijer, Herman R., 3,789,014.

Heywood, Richard D.; and Seagle, Charles E. Electronic signal device and method. 3,789,402, Cl. 340-384.00c.

Hiatt, Frank S.; and Freewater, Milton. Traffic warning signal for use on vehicles. 3,788,268, Cl. 116-28.00r.

Hicks, George P.; and Updike, Stuart J., to Du Pont de Nemours, E. I., and Company. Enzyme gel and use therefor. 3,788,950, Cl. 195-103.50r.

Hijikata, Akimitsu: *See*—
Takeo, Keinosuke; Katsumata, Tomoaki; and Hijikata, Akimitsu, 3,788,120.

Hikuma, Motohiko: *See*—
Iida, Yutaka; Hishinuma, Kazuo; Hikuma, Motohiko; Shirakawa, Tadashi; and Sakai, Susumu, 3,788,952.

Hilburn, Bennie D.: *See*—
Morphis, Charles W.; and Hilburn, Bennie D., 3,787,951.

Hildreth, Clarence L., to Ethyl Corporation. Method of beneficiating ores. 3,788,834, Cl. 75-1.000.

Hille, Ernst; Hoyer, Ernst; Meininger, Fritz; and Rottmann, Johannes, to Farbwerke Hoechst Aktiengesellschaft vormals Meister Lucius & Bruning. Process for the preparation of fast dyeings and prints on fibrous material containing hydroxyl groups or nitroge. 3,788,801, Cl. 8-1.00p.

Hillsdale Industries, Inc.: *See*—
Veen, James C., Jr., 3,788,013.

Hirano, Takeshi, to Alps Motorola, Inc. One-point-balance adjusting device. 3,788,649, Cl. 274-1.00r.

Hird, Cletus V. Steerable toboggan. 3,788,661, Cl. 280-22.000.

Hirokawa, Kazuaki; and Anbo, Tsugio, to Shinagawa Automotive Electric Wire Co., Ltd. Electrical connector. 3,789,343, Cl. 334-49.00r.

Hirose, Hidenori; Tsubosaki, Masaaki; Sugiyama, Masayoshi; Skkita, Akira; and Kito, Mitsuo, to Kabushiki Kaisha Kohjin. Method for producing biaxially molecule-oriented polycaproamiderresin film. 3,788,503, Cl. 214-95.000.

Hirose, Ryusho: *See*—
Sugiura, Muncharu; and Hirose, Ryusho, 3,788,731.

Hirsch, Ernest G.; and Nelson, George L., to New England Power Company. Process for removing ash from precipitators. 3,788,469, Cl. 210-73.000.

Hirschhorn, Isidor S.; and Tannenbaum, Stanley, to Ronson Corporation. Chemical ignition system for a cigarette lighter using an ignition aid. 3,788,798, Cl. 431-267.000.

Hirtz, Alfred Georges Jean; and Mech, Christian Andre Lucien, to Societe Rateau. Sealing devices for rotating shafts. 3,788,652, Cl. 277-71.000.

Hishinuma, Kazuo: *See*—
Iida, Yutaka; Hishinuma, Kazuo; Hikuma, Motohiko; Shirakawa, Tadashi; and Sakai, Susumu, 3,788,952.

Hitachi, Ltd.: *See*—
Ayaki, Susumu; and Shimano, Masaru, 3,789,141.
Ono, Minoru; and Momoi, Toshimitu, 3,788,913.
Terada, Toshimichi, 3,789,138.
Tomita, Yoshifumi; and Akeyama, Masamoto, 3,787,939.
Yamamoto, Masayuki; Kobayashi, Kazuo; and Ohashi, Youitu, 3,788,905.
Yamazaki, Eiichi; Maruyama, Koichi; and Ueda, Toshio, 3,788,200.
Yamazaki, Eiichi; and Kanai, Hiromi, 3,789,254.

Yoshida, Isao; Tokuyama, Takashi; Nishimatsu, Shigeru; and Ikeda, Takahide, 3,787,962.

Hitco: *See—*
Babayan, Eduard P., 3,789,071.
Lee, George Dick, 3,788,937.

Hittel, William C.: *See—*
Cole, Raymond C.; Hittel, William C.; and Donaghy, James G., 3,789,098.

Ho, Irving T.: *See—*
Beausoleil, William F.; Ho, Irving T.; and Yu, Hwa Nien, 3,789,247.

Hoadley, Harvey O.; Wolfe, Robert N.; Palmer, Beverly F.; and Van Heyningen, Roger S., to Eastman Kodak Company. Projection screen fabrication apparatus and method. 3,788,171, Cl. 83-5.000.

Hodosh, Milton, to Research Corporation. Plastic bone composition and method of making same. 3,789,029, Cl. 260-2.50r.

Hoesch Aktiengesellschaft: *See—*
Klinkosch, Reinhard, 3,788,932.

Hoeschele, Guenther Kurt, to Du Pont de Nemours, E. I., and Company. Polyurethane-polyurea elastomers based on high trans-trans, 4,4'-methylenebis-(cyclohexyl isocyanate). 3,789,032, Cl. 260-75.0nt.

Hoffman, Eric J.; and Loessi, Jack C., to United States of America, Navy. Method and apparatus for synchronizing split-phase PCM signals. 3,789,303, Cl. 325-321.000.

Hoffman, Murray, to International Telephone and Telegraph Corporation. Variable frequency and coupling equalizer and method for tuning. 3,789,325, Cl. 333-28.00r.

Hoffmann-La Roche Inc.: *See—*
Frick, Heinrich; Halder, Niklaus; and Vogler, Willy, 3,789,086.

Hofmanner, Friedrich: *See—*
Koenig, Peter J.; and Hofmanner, Friedrich, 3,788,840.

Hogan, Robert J.: *See—*
Nolan, George J.; and Hogan, Robert J., 3,789,078.

Hoglund, Edward: *See—*
Stade, Bertil; and Hoglund, Edward, 3,788,677.

Hohberg, Georg: *See—*
Pappers, Rudolf; Hohberg, Georg; and John, Kurt, : 88,793.

Holberg, Robert E. Method and apparatus for laying a pipe line. 3,788,085, Cl. 61-72.400.

Holdeman, John W.; and McMillen, Kenneth G.; deceased (by McMillen, Leanne S.; administratrix), to Borg-Warner Corporation. Valve mechanism. 3,788,075, Cl. 60-424.000.

Holderbank Financiere Glarus AG: *See—*
Koenig, Peter J.; and Hofmanner, Friedrich, 3,788,840.

Holko, Kenneth H.: *See—*
Moore, Thomas J.; and Holko, Kenneth H., 3,787,959.

Holland, John H., to Arkansas Rock and Gravel Co. Material delivery system. 3,788,504, Cl. 214-152.000.

Holm, John A.; and Lapinski, David A., to Ford Motor Company. Overvoltage protection circuit. 3,789,269, Cl. 317-23.000.

Holm, Kurt Anders, to Vddeholms Aktiebol AG. Conveyor. 3,788,459, Cl. 198-218.000.

Holmes, Stannard D. Chair support for reinforcing rods. 3,788,025, Cl. 52-685.000.

Holmes, William Samuel: *See—*
Bennett, Brian Garner; and Holmes, William Samuel, 3,788,986.

Holsinger, Wilmar O., 2C-2B Corporation. Hydrometallurgical solubilizer with selective electroplating mechanism. 3,788,965, Cl. 204-234.000.

Holt, Terence Albert; and Barre, Jean-Gabriel, to Centre Technique de Cuir. Device for mounting the toe and heel ends of a shoe upper. 3,787,915, Cl. 12-8.100.

Holz, George E.; and Ogle, James, to Burroughs Corporation. Display panel. 3,789,265, Cl. 315-169.0tv.

Holzapfel, Christian, K.G.: *See—*
Epperlein, Helmut; and Hoscheler, Edgar, 3,788,022.

Honeywell Inc.: *See—*
Breikss, Ivars Peter, 3,789,379.
Kabat, John L., 3,789,283.
Mathews, Frederic M., 3,788,299.
Pick, William Albert, 3,789,176.
Schebalin, Sergei, 3,788,891.

Honeywell Information Systems, Inc.: *See—*
Barlow, George Joseph, 3,789,204.
Guntrum, William E.; Pexton, Harold W.; and Shores, Michael P., 3,787,963.
Jones, William H., 3,789,207.
Towns, Marion L., 3,789,400.

Honfo, Satoru: *See—*
Sato, Msamichi; Honfo, Satoru; and Komaki, Takao, 3,789,224.

Honjo, Satoru; and Fukushima, Osamu, to Fuji Photo Film Co., Ltd. Method of fixing images obtained by liquid development in electrophotography. 3,788,930, Cl. 156-307.000.

Hoogovens Ijmuiden B.V.: *See—*
Van Laar, Jacobus; and Felthuis, Jacob, 3,788,622.

Hoover, Maurice W.; and Hoover, Rhea M. Partially simulated tomato product. 3,788,862, Cl. 426-177.000.

Hoover, Rhea M.: *See—*
Hoover, Maurice W.; and Hoover, Rhea M., 3,788,862.

Horiba Ltd.: *See—*
Shimazaki, Toshio; Tamei, Fumio; and Yabagida, Yoshio, 3,788,751.

Hornor, Eugene Marshall: *See—*
Brown, William B.; Besnyo, George Frank; and Hornor, Eugene Marshall, 3,788,213.

Horsting, Carel W.: *See—*
Freedman, Norman S., granted to United States Atomic Energy Commission under the provision of 42 U.S.C. 2182; Horsting, Carel W.; Lawrence, Walter F.; and Carrona, John J., 3,787,958.

Hoscheler, Edgar: *See—*
Epperlein, Helmut; and Hoscheler, Edgar, 3,788,022.

Hoshi, Hiroshi: *See—*
Susuki, Rinnosuke; Hoshi, Hiroshi; and Umeya, Kaoru, 3,788,919.

Hosmer, Max E., to Freedman Artcraft Engineering Corporation. Display fixture. 3,788,717, Cl. 312-122.000.

Hotz, Kenneth J., Jr.; Steiner, Edward; and Fox, Gary L., to Wright, Barry, Corporation. Pneumatic isolator. 3,788,628, Cl. 267-65.00r.

Hough, Harold L.; and Wierzbicki, Julian J., to GTE Sylvania, Incorporated. Lighting fixture. 3,788,560, Cl. 240-51.11r.

Houst, Douglas R.; Jones, Kenneth R.; and Lajmeister, Bruce R., to General Electric Company. Impact absorber for rotary mower blade. 3,788,050, Cl. 56-295.000.

Hoyer, Ernst: *See—*
Hille, Ernst; Hoyer, Ernst; Meininger, Fritz; and Rottmann, Johannes, 3,788,801.

Hoyer, Georg-Alexander; and Pieroh, Ernst Albrecht, to Schering AG. Fungicidal and fungistatic thiocarbonates. 3,789,061, Cl. 260-455.00b.

Hoyle, Geoffrey; and Longbottom, David Melvin, to British Iron and Steel Research Associates, The. Metal refining process. 3,788,381, Cl. 164-52.000.

Hrachowitz, Franz: *See—*
Smolka, Thomas Gordon; and Hrachowitz, Franz, 3,788,660.

Hsu, Charles F.; Jiu, James; and Mizuba, Seth Setsuo, to Searle, G. D., & Co. Microbiological reduction of 10(11) unsaturated prostaglandins. 3,788,947, Cl. 195-51.00r.

HTL Industries, Inc.: *See—*
Kramer, Jack M.; and Sitabkhan, Abdul N., 3,788,666.

Hudspeth, Patrick William: *See—*
Dempsey, Edward Justing; Kent, David Earl; and Hudspeth, Patrick William, 3,789,279.

Huey, Stanton E., Jr. Floating hunting blind. 3,787,912, Cl. 9-5.000.

Hughes Aircraft Company: *See—*
Dalena, Rudolph; Onishi, Roy K.; and Walker, Donald F., 3,789,403.
Dehne, Axel G., 3,788,088.
Margerum, John D., 3,788,858.

Hull, Thomas N., Jr., to General Electric Company. Low heat rise gearbox. 3,788,426, Cl. 184-1.00e.

Humen, Nicholas: *See—*
Brorein, William J.; and Humen, Nicholas, 3,789,344.

Humphreys Corporation: *See—*
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Humpoletz, Justus Ernest: *See—*
Walker, Peter Albert; and Humpoletz, Justus Ernest, 3,789,158.

Hunt, Harry. Sleeping bag construction. 3,787,906, Cl. 5-343.000.

Hunt, James G., to Polymet Corporation. Filled extrusion billets and methods of fabricating. 3,788,820, Cl. 29-187.000.

Hunter, Earl Kent; and Smith, Don G., to United States of America, Navy. Diver communication system. 3,789,353, Cl. 340-5.00t.

Hunter, Wood E.: *See—*
Seale, Virgil L.; Svarz, Jerry J.; Goretta, Louis A.; Newkirk, John D.; Hunter, Wood E.; and Sibert, Frederick J., 3,789,074.

Hurt, Harmon C., to General Motors Corporation. Disc brake actuator. 3,788,430, Cl. 188-72.600.

Husler, Balthasar, to Alphons Glutz-Blolzheim A.G. Interconnection system for structural elements. 3,788,021, Cl. 52-403.000.

Hussar, John F.: *See—*
Hechenbleiknor, Ingenuin A.; Hussar, John F.; Koeniger, Arthur F.; and Pressler, Robert L., 3,789,064.

Hutchins, Alma A. Piercing of air suction holes in abrasive sheet material. 3,788,011, Cl. 51-170.00r.

Hutchison, Bruce D.: *See—*
McNaughton, Andrew; and Hutchison, Bruce D., 3,788,274.

Hutchison, David John, to Monostruct Corporation Limited. Method of producing a molded foamed structural member having a honeycomb core adapted for venting. 3,789,094, Cl. 264-45.000.

Huttunen, Jouko, to Neste Oy. Method for plasticizing wood. 3,788,929, Cl. 156-307.000.

Hydril Company: *See—*
Mott, James D., 3,788,594.

Hydrocarbon Research, Inc.: *See—*
Wolk, Ronald H.; Chervenak, Michael C.; and Alpert, Seymour B., 3,788,973.

Hynes, James A., to Printing Plate Supply Company. Laminated printing plate base. 3,788,931, Cl. 156-309.000.

Hyun, Kyung Ho, to Korea Institute of Science & Technology. Burst cartridge detection system for use with gas-cooled reactors. 3,788,942, Cl. 176-109.01d.

Ichihara, Koji; Tanaka, Hideki; Ishida, Kazutaka; and Handa, Minoru, to Furuno Electric Company, Limited. Synchronous system. 3,789,408, Cl. 343-105.00r.

Ichioka, Hisakazu, to Yuken Kogyo Company, Ltd. Electromagnetic flow controlling valve. 3,788,597, Cl. 251-129.000.

Ideal Soap Company: *See—*
Tanaka, Yoshio, 3,789,011.

Idei, Gijun; Onoyama, Atsushi; Aihara, Mitsuo; Suzuki, Seigo; Egawa, Hideharu; and Yamaga, Eiichi, to Tokyo Shibaura Electric Co., Ltd. Electronic digital clock apparatus. 3,788,058, Cl. 58-23.00r.

Idelson, Elbert M., to Polaroid Corporation. Ligands which are also silver halide developing agents. 3,789,062, Cl. 260-463.000.

Iida, Yutaka; Hishinuma, Kazuo; Hikuma, Motohiko; Shirakawa, Tadashi; and Sakai, Susumu, to Ajinomoto Co. Apparatus for controlling the fermentation of volatile organic compounds. 3,788,952, Cl. 195-127.000.

Ikeda, Takahide: *See—*
Yoshida, Isao; Tokuyama, Takashi; Nishimatsu, Shigeru; and Ikeda, Takahide, 3,787,962.

Ikegai Tekko Kabushiki Kaisha: *See—*
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Illinois Railway Equipment Company: *See—*
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Illinois Tool Works Inc.: *See—*
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Imaki, Naoshi: *See—*
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Imperial Chemical Industries, Limited: *See—*
Birchall, James Derek; and Cassidy, John Elward, 3,788,885.
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McMillan, Ian; and Prest, Jeffrey, 3,789,005.
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Imperial Optical Company, Ltd.; t/a Safety Supply Company: *See—*
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IMS Limited: *See—*
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Incremona, Joseph H., to Du Pont de Nemours, E. I., and Company. Oligomer polyimide precursors. 3,789,048, Cl. 260-30.200.

Inductosyn Corporation: *See—*
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Industrial Nucleonics Corporation: *See—*
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Industriewerk Schaeffler OHG: *See—*
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Industriewerk Schaeffler: *See—*
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Institut Francais du Petrole, des Carburants et Lubrifiants: *See—*
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Castela, Andre; and Joubert, Philippe, 3,788,074.

Institute of Gas Technology: *See—*
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Instrument Development Laboratories, Inc.: *See—*
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Interlake Inc.: *See—*
Burns, William F.; and Taylor, Robin, 3,788,499.

International B. F. Goodrich-Europe B.V.: *See—*
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International Business Machines Corporation: *See—*
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International Lead Zinc Research Organization, Inc.: *See—*
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International Paper Company: *See—*
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International Playtex Corporation: *See—*
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International Standard Electric Corporation: *See—*
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Iowa State University Research Foundation: *See—*
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Iowa State University Research Foundation, Inc.: *See—*
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Irani, Farhad A., to Du Pont de Nemours, E. I., and Company. Process for the preparation of large particle silica sols. 3,789,009, Cl. 252-313.00s.

Ireco Chemicals: *See—*
Udy, Lex Lynn; Jessop, Harvey Allred; and Wasson, Daniel Aaron, 3,788,909.

Iriko, Fumio: *See—*
Sato, Wasuke; Iriko, Fumio; Yamamoto, Sadao; Fujisawa, Mitsumaro; and Hatakeyama, Shigeyuki, 3,788,199.

Irwin, Malcolm F., to Pro-Tech, Inc. Liquid sampling. 3,788,145, Cl. 73-421.00b.

Isaacson, Manfred A., to General Motors Corporation. Dampened shock absorbing bumper. 3,788,626, Cl. 267-9.00c.

Isao, Sherman H. M.: *See—*
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Isernhagen, Fritz: *See—*
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Ishida, Kazutaka: *See—*
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Ishii, Yasushi, 1/2 to Nissan Motor Company. Multiplex transmission method. 3,789,148, Cl. 179-15.0al.

Istituto Chemioterapico Italiano S.p.A.: *See—*
Garzia, Aldo, 3,789,070.

Itek Corporation: *See—*
Greenleaf, Allen H., 3,788,730.

Ito, Shoichi; Ninomiya, Mikio; and Uchida, Hidekuni, to Taisho Pharmaceutical Co., Ltd. Aminoethanesulfonic acid derivative. 3,789,068, Cl. 260-507.00r.

Ito, Sinzo. Curb and drain unit. 3,788,756, Cl. 404-4.000.

Itoh, Takayuki, to Takachiho Kocki Kabushiki Kaisha. Random-access memory device using sequential-access memories. 3,789,366, Cl. 340-172.500.

Itoh, Takayuki, to Takachiho Kocki Kabushiki Kaisha. Restoration system for pattern information using and type logic of adjacent bits. 3,789,386, Cl. 340-324.0ad.

ITT Industries, Inc.: *See—*
Von Grunberg, Hubertus; Fink, Werner; and Kircher, Dieter, 3,788,710.

Ivas, Thomas W.; and Slavik, William H., to Motorola, Inc. Preset control system for a color television receiver. 3,789,134, Cl. 178-5.4ac.

Iverson, John Howard: *See—*
Dumstorff, Eugene Francis; Iverson, John Howard; Schloss, Phillip Christian; and Wong, Philip Chock-Yuch, 3,789,367.

Iwakami, Takuya, to Nippon Electric Company, Limited. Variable line equalizer. 3,789,326, Cl. 333-28.00r.

Iwami, Isamu; Kawasaki, Hironobu; and Kinoshita, Hideo, to Asahi-Dow, Limited. Process for producing metal-containing ethylenic copolymer. 3,789,035, Cl. 260-78.50t.

Iwase, Nobuo; and Okamura, Soji, to Tokyo Shibaura Electric Co. Ltd. Lumped constant circulator. 3,789,324, Cl. 333-1.100.

Izawa, Shinichi; Toyama, Kunio; Sugawara, Yoshiaki; Tanaka, Tsutomu; and Okamoto, Hidehiro, to Asahi-Dow Limited. Process for producing polyphenylene ethers. 3,789,054, Cl. 260-47.0et.

Jackson, Burtis R. Easily installed belt. 3,788,156, Cl. 74-238.000.

Jackson, Robert V., to McCulloch Corporation. Welding control circuit and method. 3,789,229, Cl. 290-40.000.

Jacobs, Harvey Barry. Distally perforated catheter for use in ventilating system. 3,788,326, Cl. 128-305.000.

Jacobs, Melvin A.; and Woodward, John W., to GTE Automatic Electric Laboratories Incorporated. Subsystem data transfer in a telephone system. 3,789,150, Cl. 179-18.0et.

Jacobsen, Bjarne Hamilton, to Astra-Sjuco; a division under Astra-Gruppen A/S. Vein stripping surgical instrument. 3,788,325, Cl. 128-303.00r.

Jacobson, Robert S.: *See—*
Ross, Gerald F.; and Jacobson, Robert S., 3,789,413.

Jaecklin, Andre; and Scharli, Otto. Holder member for a semiconductor element. 3,789,248, Cl. 310-9.400.

Jameel, Khaja M.; and Mueller, Von W., to GTE Automatic Electric Laboratories, Incorporated. In-line reed capsule crosspoint matrix switch. 3,789,332, Cl. 335-152.000.

James, Randell Leland, to International Business Machines Corporation. Method of testing MOSFET planar boards. 3,789,205, Cl. 235-153.0ac.

Janning, John L., to National Cash Register Company, The. Plasma shift register with overlapping glow. 3,789,264, Cl. 315-84.600.

Jansson, Curt Evert: *See—*
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Japan Exlan Company Limited: *See—*
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Japan Steel Works Ltd.: *See—*
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Japanese National Railways: *See—*
Kitsuda, Toshiyuki; Yamakawa, Choji; and Hattori, Kenichi, 3,788,868.

Jasson, Philippe; and Chatourel, Pierre, to Regie Nationale des Usines Renault. Methods of manufacturing shell moulds. 3,788,380, Cl. 164-26.000.

Jay, Pierre: *See—*
Coquillion, Jean; and Jay, Pierre, 3,788,998.

Jefferey, Owen E.: *See—*
Bear, Fred B.; and Jefferey, Owen E., 3,787,984.

Jeffries, Thomas Oliver, to Brunel University. Vehicle-control apparatus. 3,788,234, Cl. 104-152.000.

Jen, Dixson Teh-Chao; and Lotan, Amram Zvi, to Bunker-Ramo Corporation, The. Processor interrupt system. 3,789,365, Cl. 340-172.500.

Jenkins, Joe H., to Clay, Robert and King, Kenneth F. Hoop pushing toy. 3,788,000, Cl. 46-205.000.

Jenoptik Jena G.m.b.H.: *See—*
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Jeno's, Inc.: *See—*
Moline, Roy Virgil, 3,788,030.

Jentsch, Dietrich, to Dorma-Baubeschlag GmbH & Co., KG. Automatic door closer with substantially prism-shaped housing. 3,787,924, Cl. 16-49.000.

Jerre, Sven Torsten: *See—*
Martensson, Kjell Halvard; Linde, Bjorn H:Son; Palsson, Jan-Frederik; and Jerre, Sven Torsten, 3,788,033.

Jessop, Harvey Allred: *See—*
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Jintan Terumo Co., Ltd.: *See—*
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Jiu, James: *See—*
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Campbell, Roger G., Sr., Goff, Richard E., Jr.; and Guay, Normand D., 3,788,366.
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Johnson, Claude O.: *See—*
Chester, Frank S.; Johnson, Claude O.; Kavanagh, Ira Keith; and van Horik, Leonard R., 3,788,117.

Johnson, David E.; and Rehfeld, Frederick, to General Motors Corporation. Fluid pump with flow control means. 3,788,770, Cl. 417-62.000.

Johnson, Davis O.; and Lee, Terry. Removable grain body sides for flat load bed. 3,788,684, Cl. 296-36.000.

Johnson, Edward. Furniture module. 3,787,909, Cl. 5-352.000.

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Johnson, Gerald E., to Martin Marietta Corporation. Eight bit digital phase shifter utilizing plurality of switchable low pass filters. 3,789,329, Cl. 333-31.00r.

Johnson, Howard, Company: *See—*
Glass, Earl M., 3,788,176.

Johnson, Jeffrey L.: *See—*
Connell, Lehman J.; and Johnson, Jeffrey L., 3,788,148.

Johnson, Kenneth R., to Parker-Hannifin Corporation. Valve guide. 3,788,348, Cl. 137-542.000.

Johnson, Raymond Arthur, to U.M.C. Industries, Inc. Money-handling device with pivotal escron platform. 3,788,333, Cl. 133-2.000.

Johnson, Raymond E.; Miller, Wendell E.; and McMillen, Kenneth G.; deceased (by McMillen, Leanne S.; administratrix), to Borg-Warner Corporation. Open center control of variable pumps. 3,788,077, Cl. 60-452.000.

Johnson, Richard A.: *See—*
Thompson, Kenneth N.; Johnson, Richard A.; and Lloyd, Norman E., 3,788,945.

Johnson, Robert C.: *See—*
Neel, Robert M.; Lloyd, Clarence Robert; and Johnson, Robert C., 3,788,331.

Johnson, Robert E., to Whittaker Corporation. Vehicle traction bar. 3,788,629, Cl. 267-66.000.

Johnston, James J., to Automatic Equipment Development Corporation. Circuit board assembly. 3,789,271, Cl. 317-101.0cc.

Johnston, James R.: *See—*
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Johnston, Richard P.: *See—*
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Jones, Kenneth R.: *See—*
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Jones, Robert E., Jr.: *See—*
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Jones, William H., to Honeywell Information Systems, Inc. Integrating circuit for data recovery system. 3,789,207, Cl. 235-183.000.

Jones, William T., to Goodyear Tire & Rubber Company, The. Tear cutter. 3,788,172, Cl. 83-9.000.

Joseph, Eugene Stephen. Apparatus for performing fabricating operations on sheet material, and a combination of punch and die members for incorporation in such apparatus. 3,788,118, Cl. 72-324.000.

Joubert, Philippe: *See—*
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Castela, Andre; and Joubert, Philippe, 3,788,074.

Juntgen, Harald; Knoblauch, Karl; Zundorf, Dieter; and Gappa, Gunther, to Bergwerksverband G.m.b.H. Method of cleaning solids-containing sewage. 3,788,985, Cl. 210-33.000.

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Kabat, John L., to Honeywell Inc. Condition control reversible motor system. 3,789,283, Cl. 318-295.000.

Kabel- und Metallwerke Gutehoffnungshutte Aktiengesellschaft: *See—*
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Kabota, Katuhiko: *See—*
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Kabushiki Kaisha Kohjin: *See—*
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Kabushiki Kaisha Matsuya Tekkosho: *See—*
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Kabushiki Kaisha Synapse, President Hiroshi Yamamoto: *See—*
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Kaeppler, Gerhard; Ficker, Stefan; and Pergande, Wilfried, to Slick Corporation, The. Apparatus for filtering gases having a movable filter bag unit. 3,788,046, Cl. 55-341.000.

Kaferlf, Joseph S.: *See—*
Beigay, Jack M.; Choby, Edward G., Jr.; and Kaferlf, Joseph S., 3,788,112.

Kagedal, Sven Lennart; and Akerstrom, Stig Hjalmar Johannes, to Pharmacia AB. Method of binding, by covalent bonds, proteins and polypeptides polymers using cyanates. 3,788,948, Cl. 195-68.000.

Kahn, Herbert L.: *See—*
Slavin, Sabina; and Kahn, Herbert L., 3,788,752.

Kalfas, Donald Joseph: *See—*
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Kaltenbach & Voigt: *See—*
Farian, Gerhard; and Fink, Willi, 3,787,977.

Kalwaites, Frank, to Johnson & Johnson. Method and apparatus (continuous imperforate portions on backing means of closed sandwich). 3,787,932, Cl. 19-161.00p.

Kalz, Dietmar; Wolfrum, Gerhard; and Neeff, Rutger, to Bayer Aktiengesellschaft. Process for the dyeing of synthetic fibre materials with quinophthalone dyestuffs from organic solvents. 3,788,810, Cl. 8-162.00r.

Kaman, Frank A.: *See—*
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Kaman Sciences Corporation, mesne: *See—*
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Kameda, Seizi: *See—*
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Kamibayashi, Tetsusaburo: *See—*
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Kanai, Hiromi: *See—*
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Kaneko, Mitsutaka: *See—*
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Kitsuda, Toshiyuki; Yamakawa, Choji; and Hattori, Kenichi, 3,788,868.

Kapitan, John R. Self-attaching button. 3,787,935, Cl. 24-113.0mp.

Kapr, Charles F.: *See—*
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Katabe, Kenichi: *See—*
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Katayama, Shizuo: *See—*
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Katsumata, Tomoaki: *See—*
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Katsumori, Teiji, to Tokico Limited. Telescopic suspension unit. 3,788,433, Cl. 188-314.000.

Kavanagh, Ira Keith: *See—*
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Kawahata, Masayuki; and Price, Kenneth R., to General Electric Company. Wastewater treatment using electrolysis with activated carbon cathode. 3,788,967, Cl. 204-277.000.

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Kawanaka, Hideo; Katabe, Kenichi; and Kameda, Seizi, to Kao Soap Co., Ltd. Fiber-lubricant composition. 3,788,888, Cl. 117-139.50a.

Kawasaki, Hironobu: *See—*
Iwami, Isamu; Kawasaki, Hironobu; and Kinoshita, Hideo, 3,789,035.

Kawasaki Jukogyo Kabushiki Kaisha: *See—*
Shibata, Fukuo, 3,789,281.

Kay, John William Dixon, to Abbott Laboratories. Fluorescent labeled antibody reagent. 3,789,116, Cl. 424-8.000.

Kay, William Chee: *See—*
Creighton, Stephen Mark; Mitchell, David Lawrence; and Kay, William Chee, 3,788,003.

Keck, Johannes: *See—*
Kruger, Gerd; Zipp, Otmar; Keck, Johannes; Nickl, Josef; Machleidt, Hans; Ohnacker, Gerhard; Engelhorn, Robert; and Puschmann, Sigfrid, 3,789,125.

Keeler, Frederick D., to K.L.M. Company, The. Method and apparatus for sealing plastic closure to plastic containers. 3,788,509, Cl. 215-42.000.

Keenan, Michael G.; Lynch, William M.; and Priedigkeit, John H., to United States of America, Army, mesne. Aircraft antenna balance techniques. 3,789,412, Cl. 343-114.000.

Keigley, Ronald E. Hydraulic hand tool. 3,788,173, Cl. 83-554.000.

Kellar, Richard L.: *See—*
Paelian, Owen; Rister, Donald R.; and Kellar, Richard L., 3,788,133.

Kelp, Fritz: *See—*
Heitmann, Hans-Gunter; and Kelp, Fritz, 3,788,068.

Kemerer, Douglas W.: *See—*
Donofrio, Nicholas M.; and Kemerer, Douglas W., 3,789,243.

Kemlite Corporation: *See—*
Morse, Donald B.; and Pribish, Bernard A., 3,788,174.

Kemnitz, Robert H., to Allis-Chalmers Corporation. Crusher with hydraulically adjusted rotary assembly for supporting and gyrating a conical head. 3,788,569, Cl. 241-214.000.

Kempson, Bertram Carl; and Nicholls, James Andrew, to Dowty Hydraulic Units Limited. Hydraulic apparatus. 3,788,063, Cl. 60-19.000.

Kendall Company, The: *See—*
Allen, George H., 3,787,930.
Dye, John F., 3,788,320.

Kendall Company, The, mesne: *See—*
Hammond, Fred H., Jr., 3,788,135.

Kenna, Fenton L., Jr.: *See—*
Fachini, Robert M.; Kenna, Fenton L., Jr.; Barrett, Monroe C.; Nickla, Louis E.; and Graham, Robert L., 3,788,495.

Kennecott Copper Corporation: *See—*
Agarwal, Jagdish C.; and Wilder, Thomas C., 3,788,841.
Beck, Russell R.; George, David B.; and Anderson, Charles W., 3,789,097.

Kent, David Earl: *See—*
Dempsey, Edward Justing; Kent, David Earl; and Hudspeth, Patrick William, 3,789,279.

Kent, Graham B., to Actuated Controls Limited. Pressure switch with operating lever having manually adjustable pre-loading means therefor. 3,789,171, Cl. 200-83.00s.

Kenyon, Richard L.: *See—*
Bragg, Kenneth R.; and Kenyon, Richard L., 3,788,040.

Kernan, Hans: *See—*
Pantel, Wolfgang, 3,788,178.

Kervizic, Jacques; Masic, Renc; Shroff, Arvind; and Warnecke, Robert Jean, to Thomson-CSF. Crucible for vaporizing chemically active elements method of manufacturing the same and ion source including said crucible. 3,789,253, Cl. 313-63.000.

Keystone Industries, Inc.: *See—*
Hawthorne, Vaughn I.; and Lundstrom, Ronald H., 3,788,493.

Khalafalla, Sanaa E.: *See—*
Reimers, George W.; Rholl, Stephen A.; and Khalafalla, Sanaa E., 3,788,465.

Kidd, Wayne L., to Xerox Corporation. Luminescent cover. 3,788,737, Cl. 355-3.00r.

Kieserling, Th., & Albrecht: *See—*
Riedel, Franz, 3,788,170.

Kigherer, Robert: *See—*
Fischer, Karl; Gossler, Gerhard; and Kigherer, Robert, 3,789,189.

Killinger, Fred M., to Upjohn Company, The. Apparatus for transferring liquid between a container and a flexible bag. 3,788,369, Cl. 141-114.000.

Kilroy, Eugene J., Jr.; Du Breuil, Philip B.; and Dennison, Scott C., to Mattel, Inc. Gliding toy. 3,787,998, Cl. 46-79.000.

Kim, Sung Soo; and Dusseau, Andress. Expandable cannula, especially for medical purposes. 3,788,318, Cl. 128-214.400.

Kimberly-Clark Corporation: *See—*
Brock, Robert James; Hansen, Paul Bernard; and Wilson, John C., 3,788,936.

Kinemura, Masao; and Arita, Koshei, 1/2 to Arita, Koshei. Number of days integrating type time switch. 3,789,196, Cl. 235-132.00a.

King, Arthur S. Particle separator. 3,788,473, Cl. 210-112.000.

King, Dallas E., to General Motors Corporation. Spring arm bearing retainer. 3,789,251, Cl. 310-239.000.

King, James R., Jr.: *See—*
Cohen, Hyman L.; King, James R., Jr.; and Minsk, Louis M., 3,788,855.

King, Kenneth F.: *See—*
Jenkins, Joe H., 3,788,000.

Kinney, Robert E.: *See—*
Anderson, James J.; Camacho, Vasco G.; and Kinney, Robert E., 3,789,091.

Kinoshita, Hideo: *See—*
Iwami, Isamu; Kawasaki, Hironobu; and Kinoshita, Hideo, 3,789,035.

Kinoshita, Shushi: *See—*
Suzuki, Akira; Kinoshita, Shushi; and Ueda, Takeshi, 3,788,903.

Kinsley, William Henry, Jr.: *See—*
Garrett, Carl Eugene; Kinsley, William Henry, Jr.; and Moody, Larry Dean, 3,789,099.

Kirata, Sadao: *See—*
Kishimoto, Akira; Kirata, Sadao; and Ueno, Hiroshi, 3,789,085.

Kirby, John, to Kirby, Lester, Electronics Limited. Relating to counting machines. 3,789,194, Cl. 235-92.0pk.

Kirby, Lester, Electronics Limited: *See—*
Kirby, John, 3,789,194.

Kircher, Dieter: *See—*
Von Grunberg, Hubertus; Fink, Werner; and Kircher, Dieter, 3,788,710.

Kirk, Merritt C., Jr., to Sun Oil Company. Production of high quality blended jet fuels. 3,788,971, Cl. 208-57.000.

Kirk, Merritt C., Jr., to Sun Oil Company of Pennsylvania. Multi-stage process for producing high UR oil by hydrogenation. 3,788,976, Cl. 208-89.000.

Kirk, William P.; and Reynolds, Dwight W. Method and apparatus for collecting a floating liquid. 3,788,079, Cl. 61-1.00f.

Kirkland, Walter Dean: *See—*
Davis, Loren Roger; and Kirkland, Walter Dean, 3,788,524.

Kirsch, Jerry. Method for vacuum pick-up of porous materials. 3,788,505, Cl. 214-152.000.

Kirschstein, Werner P.; and Wagner, John R., to Loew's Theatres, Inc. Method and apparatus for measuring the bulk density of a material under pressure. 3,788,125, Cl. 73-32.000.

Kiselewski, Donald L., to Binkley Company, The. Adjustable metal door frame construction. 3,788,019, Cl. 52-212.000.

Kiser, James W.: *See—*
Carpenter, Loyde M.; Kiser, James W.; and Leonard, Lee V., 3,789,177.

Kishimoto, Akira; Kirata, Sadao; and Ueno, Hiroshi, to Toyo Seikan Kaisha, Ltd. Polyethylene block-graft copolymers and method for preparing the same. 3,789,085, Cl. 260-897.00b.

Kistner, Howard M. Orthopedic splint. 3,788,307, Cl. 128-77.000.

Kito, Mitsuo: *See—*
Hirose, Hidenori; Tsubosaki, Masaaki; Sugiyama, Masayoshi; Skita, Akira; and Kito, Mitsuo, 3,788,503.

Kitsuda, Toshiyuki; Yamakawa, Choji; and Hattori, Kenichi, to Kao Soap Co., Ltd. and Japanese National Railways. Method for maintaining fluidity of cement compositions. 3,788,868, Cl. 106-90.000.

Kitzie, John, to Becton, Dickinson, and Company. Stopcock. 3,788,602, Cl. 251-312.000.

Klatt, Alfred; Isernhagen, Fritz; Weise, Lutz; and Reinecke, Erich, to Westinghouse Bremsen- und Apparatebau GmbH. Wheel slip control apparatus having quick closing valves. 3,788,592, Cl. 251-25.000.

Klatt, Peter; Seeger, Karl; and Wilborn, Wolfgang, to Farbwerke Hoechst Aktiengesellschaft vormals Meister Lucius & Bruning. Device for applying medical substances to the nasal mucosa. 3,788,296, Cl. 128-268.000.

Klebe, Johann F.; and Windish, Thomas J., to General Electric Company. Imido-alkylene substituted aromatic carbocyclic polymers. 3,789,052, Cl. 260-47.0cz.

Klebe, Johann F.; and Wroblewski, Henry A., to General Electric Company. Aliphatically unsaturated imides and method for making same. 3,789,055, Cl. 260-51.00r.

Klebert, Wolfgang: *See*—
Traubel, Harko; and Klebert, Wolfgang, 3,789,027.

Klein, Keith W., to General Electric Company. Miniature circuit breaker with electronic tripping means. 3,789,268, Cl. 319-18.00d.

Klein, Schanzlin & Becker Aktiengesellschaft: *See*—
Schneider, Wolfgang; Piekarek, Egbert Diethelm; and Thommes, Stefan, 3,788,580.

Klein, Stewart E.; and Gagliardi, D. Donald; deceased (by Gagliardi, Frances Dodge; executrix), to Sanitized Incorporated. Method of concurrently dyeing and properties to imparting durable bioactive properties to synthetic textiles. 3,788,803, Cl. 8-17.000

Klein, Walter F.: *See*—
Bruer, James D.; Buddington, Donald L.; and Klein, Walter F., 3,789,160.

Kline, Donald D., to Commercial Electronics, Inc. Television camera aperture correction system. 3,789,133, Cl. 178-5.40r.

Klinger, Isaac: *See*—
Friedman, Mitchell; Kamentsky, Louis A.; and Klinger, Isaac, 3,788,744.

Klink, Jerome P.; Lyle, Phra D.; and Griffith, Terry L., to Owens-Corning Fiberglas Corporation. Apparatus for winding textile material. 3,788,826, Cl. 65-11.00w.

Klinkosch, Reinhard, to Hoesch Aktiengesellschaft. Apparatus for making structural units. 3,788,932, Cl. 156-499.000.

Klippan GmbH: *See*—
Weman, Per Olof, 3,788,663.

K.L.M. Company, The: *See*—
Keeler, Frederick D., 3,788,509.

Klockner-Werke AG: *See*—
Geck, Gunter; and Langhammer, Hans Jurgen, 3,788,837.

Klopping, Hein L., to Du Pont de Nemours, E. I., and Company. Fungicidal compositions of transition metal complexes of substituted 2-benzimidazolecarbamic acid, alkyl esters. 3,789,122, Cl. 424-245.000.

Klossika, Walter, to Licentia Patent-Verwaltungs-G.m.b.H. Method of connecting a contacting wire to metal a contact on the surface of a semiconductor element. 3,787,966, Cl. 29-628.000.

Klotsvog, Grigory Naumovich. Two-sped drive. 3,788,165, Cl. 74-675.000.

Kludas, Martin, to Heyl & Co., Chem.-Pharm. Fabrik. Treatment of colitis alcerosca. 3,789,124, Cl. 424-319.000.

Knapsack Aktiengesellschaft: *See*—
Nolte, Gerhard; Rabowsky, Hans; Krause, Johannes; and Narres, Hans-Dieter, 3,788,842.

Knauer GHBH & Co., KG Maschinenfabrik: *See*—
Pappers, Rudolf; Hohberg, Georg; and John, Kurt, 3,788,793.

Kneeland, Howard: *See*—
Tornquist, Nils M.; Kneeland, Howard; and Sessions, William K., Jr., 3,788,061.

Knickerbocker, Karl. Drop-shelf dispensing mechanism. 3,788,516, Cl. 221-90.000.

Knight, Lindsay Charles; Finch, Colin Maxwell; Walden, Noel Harry Fred; and Racz, George, to Australasian Training Aids Proprietary Limited. Indicating the passing of a projectile through an area in space. 3,788,748, Cl. 356-141.000.

Knirsch, Gunther: *See*—
Goehle, Rolf; Velten, Walter; and Knirsch, Gunther, 3,789,334.

Knoblauch, Karl: *See*—
Juntgen, Harald; Knoblauch, Karl; Zundorf, Dieter; and Gappa, Gunther, 3,788,985.

Knohl, Friedrich Karl, to Illinois Tool Works Inc. Stapling system and method. 3,788,187, Cl. 85-49.000.

Knoos, Stellan; Ljungdahl, Soren F. S.; and Bostrom, Bertil Ingemar, 50% to AGA Aktiebolag. Fluid pressurized cover device. 3,788,395, Cl. 165-169.000.

Knowles, Peter M., to Beakbane, Henry, (Fortox) Limited. Corrugated covers for reciprocating machinery parts. 3,788,377, Cl. 160-84.00r.

Knowles, Susan: *See*—
Catherall, Reginald; and Knowles, Susan, 3,789,203.

Knutson, Oliver J.: *See*—
Church, Peter K.; and Knutson, Oliver J., 3,789,096.

Kobayashi, Kazuo: *See*—
Yamamoto, Masayuki; Kobayashi, Kazuo; and Ohashi, Youitu, 3,788,905.

Kobayashi, Sethin; Torii, Michihiro; and Okuda, Masanao, to Fuji Electrochemical Co. Ltd. Method for producing magnetic keepers. 3,788,924, Cl. 156-249.000.

Kobayashi, Toshihiko: *See*—
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Kobe Steel, Ltd.: *See*—
Suzuki, Akira; Kinoshita, Shushi; and Ueda, Takeshi, 3,788,903.

Koch, Otto: *See*—
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Kocher, Leo F.: *See*—
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Kocks, Friedrich, Firma: *See*—
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Koehring Company: *See*—
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Koenig, David Mark: *See*—
Fowler, Ronald James; Freeh, Edward James; and Koenig, David Mark, 3,787,985.

Koenig, Peter J.; and Hofmanner, Friedrich, to Concast AG and Holderbank Financiere Glarus AG. Flux powder for use during continuous casting of steel and method of producing same. 3,788,840, Cl. 75-94.000.

Koeniger, Arthur F.: *See*—
Hechenbleiknер, Ingenuin A.; Hussar, John F.; Koeniger, Arthur F.; and Pressler, Robert L., 3,789,064.

Koermer, Gerald S.: *See*—
Goering, Harlan L.; Eikenberry, John N.; and Koermer, Gerald S., 3,789,060.

Koff, Irwin: *See*—
St. Amand, Pierre; and Koff, Irwin, 3,788,543.

Kohl, Arthur L., to United States of America, Interior. Turbulence promotor system. 3,788,953, Cl. 202-173.000.

Kohler, Hans-Joachim; and Rieder, Guido, to Industriewerk Schaffler. Bearing bushing for universal joints. 3,788,712, Cl. 308-35.000.

Koike Sanso Kogyo Kabushiki Kaisha: *See*—
Ujiie, Akira; Shimoyama, Hiroshi; and Ueda, Nanji, 3,788,558.

Kojiro, Katsuto; and Elliott, Robert A., to Lilly, Eli, and Company. Sterility testing antigen products. 3,788,949, Cl. 195-100.000.

Kokorzycki, Genevieve: *See*—
Kokorzycki, Zennon, 3,788,564.

Kokorzycki, Zennon; deceased (by Kokorzycki, Genevieve; special administratrix). Water powered garbage disposal unit. 3,788,564, Cl. 241-46.00r.

Kokusai Denshin Denwa Kabushiki Kaisha: *See*—
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Watanabe, Teruji; Fukui, Takasuke; and Suzuki, Shizuo, 3,789,234.

Kola, Rolf: *See*—
Dorr, Karl-Heinz; Grimm, Hugo; and Kola, Rolf, 3,788,043.

Kolbe, John L.; and Legal, Casimer C., Jr., to Grace, W. R., & Co. Making ammonium polyphosphate in a packed column. 3,788,817, Cl. 23-259.200.

Kollar, John, to Halcon International, Inc. Process for preparing vicinal glycol esters from olefins. 3,789,065, Cl. 260-497.00r.

Koller, Manfred, to Fichtel & Sachs AG. Pneumatic suspension unit. 3,788,630, Cl. 267-65.000.

Komaki, Takao: *See*—
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Komaki, Takeshi: *See*—
Matsumura, Shiro; Shin, Hiroshi; Sugano, Junichiro; Yoshii, Tadashi; Kuriyama, Yasuhisa; and Komaki, Takeshi, 3,789,115.

Komp, Richard J., to Xerox Corporation. Photodetection device and method comprising phthalocyanine. 3,789,216, Cl. 250-211.00r.

Konan Camera Laboratory Company Limited: *See*—
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Konczal, Wolfgang: *See*—
Beier, Helmut; Handke, Siegfried; and Konczal, Wolfgang, 3,789,175.

Konig, Klaus: *See*—
Traubel, Harro; Weber, Karl-Arnold; Koch, Otto; and Konig, Klaus, 3,788,887.

Konzler, Roymond C.: *See*—
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Koor Chemicals Ltd.: *See*—
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Koppelmann, Roger Fred: *See*—
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Koppers Company, Inc.: *See*—
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Korea Institute of Science & Technology: *See*—
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Korea Institute of Science and Technology: *See*—
Nam, Joon Woo; and Choi, Ung So, 3,787,929.

Koreska, W.: *See*—
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Koskinenm, Onni S. Agricultural irrigation system. 3,788,544, Cl. 239-11.000.

Kosowsky, Leo N.; Lovejoy, Curtis N.; and Cunniff, John G., to Auric Corporation. Apparatus for intermittent electroplating strips. 3,788,963, Cl. 204-206.000.

Kosseim, Alexander J.; and Somekh, George S., to Union Carbide Corporation. Process for the separation of aromatic hydrocarbons from a mixed hydrocarbon feedstock. 3,789,077, Cl. 260-674.0se.

Kosseim, Alexander Jean-Marie: *See*—
Kubek, Daniel John; Kosseim, Alexander Jean-Marie; and Somekh, George Solomon, 3,788,980.

Kossoff, Joseph: *See*—
Ayton, Ian F.; Hartling, Donald C.; Kossoff, Joseph; and Osborne, Brian G., 3,787,999.

Kotwicki, Allan Joseph, to Bell Telephone Laboratories, Incorporated. Signal mode converter and processor. 3,789,199, Cl. 235-150.500.

Koudelka, Vladimir; and Lada, Mirko, to Naradi, narodni podnik. Pneumatic impact tool. 3,788,404, Cl. 173-139.000.

Kowalski, Anna: *See—*
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Kozawa, Mitsuo: *See—*
Sueyoshi, Toshihiko; and Kozawa, Mitsuo, 3,789,103.

Kraft, Robert E., to FMC Corporation. Latch mechanism for extensible boom. 3,788,492, Cl. 212-55.000.

Kraftwerk Union Aktiengesellschaft: *See—*
Heitmann, Hans-Gunter; and Kelp, Fritz, 3,788,068.

Krambeck, Robert Harold; and Walden, Robert Henry, to Bell Telephone Laboratories, Incorporated. Charge coupled devices employing nonuniform concentrations of immobile charge along the information channel. 3,789,267, Cl. 317-225.00c.

Kramer, Jack M.; and Sitabkhan, Abdul N., to HTL Industries, Inc. Protection system. 3,788,666, Cl. 280-150.0ab.

Kramer, Norman, to Glass, Marvin, & Associates. Decorative lighting system. 3,789,211, Cl. 240-10.00r.

Kranc, Stanley J.: *See—*
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Kraus, Bernhard Josef: *See—*
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Kraus, Charles E., to Excelermatic, Inc. Hydrostatic thrust bearing. 3,788,713, Cl. 308-160.000.

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Krause, Johannes: *See—*
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Krawagna, Alois Albin, to Imperial Optical Company, Ltd.; t/a Safety Supply Company. Ear muff assembly. 3,787,899, Cl. 2-209.000.

Krawetz, Barton; Long, Jack B.; and Mooney, Leonard J., to United States of America, Atomic Energy Commission. Electron beam-pumped gas laser system. 3,789,321, Cl. 331-94.500.

Krekeler, Claude B., to Cincinnati Mine Machinery Co., The. Chain for mining machine and the like. 3,788,711, Cl. 305-58.000.

Krieg, Adrian H. Bevelling tool. 3,787,970, Cl. 30-272.00r.

Krieg, Adrian H. Metal forming tool. 3,788,192, Cl. 90-40.000.

Krippene, Brett C.; Peterson, Morris W.; and Marshall, David M., to Babcock & Wilcox Company, The. Fuel burner. 3,788,796, Cl. 431-2.000.

Kronoff, Clarence R.; and Hayden, Donald F., to Crompton & Knowles Corporation. Selvage needle motion in a narrow ware loom. 3,788,361, Cl. 139-124.000.

Kropscott, Earle L.; and Wittenbach, Gerald R., to Dow Chemical Company, The. Process for molding objects from rapid-setting polyurethane compositions. 3,789,100, Cl. 264-219.000.

Kruger, Gerd; Zipp, Otmar; Keck, Johannes; Nickl, Josef; Machleidt, Hans; Ohnacker, Gerhard; Engelhorn, Robert; and Puschmann, Sigfrid, to Boehringer Ingelheim G.m.b.H. Pharmaceutical compositions containing halo-substituted 2-amino-benzylamine-amides. 3,79,125, Cl. 424-324.000.

Krugler, Allen D., Jr.: *See—*
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Krusemark, Frederick A. Mechanical linkage. 3,788,161, Cl. 74-516.000.

Kubek, Daniel John; Kosseim, Alexander Jean-Marie; and Somekh, George Solomon, to Union Carbide Corporation. Process for the separation of aromatic hydrocarbons from a mixed hydrocarbon feedstock. 3,788,980, Cl. 208-333.000.

Kubiak, Edward J.: *See—*
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Kubler, Friedrich: *See—*
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Kuecken, John A.; and Polgar, Michael S., to International Telephone and Telegraph Corporation. Shortened turnstile antenna. 3,789,416, Cl. 343-792.000.

Kuenzi, William A., to Miller Brewing Company. Beer carton. 3,788,538, Cl. 229-23.00r.

Kunze, Ernst-Gunter: *See—*
Baumann, Reinhold; Kunze, Ernst-Gunter; Lauerbach-Lehmeier, Robert; Striebich, Alfred; and Rothe, Hans-Joachim, 3,789,026.

Kupits, John J., to Grace, W. R., & Co. Removable floor and wall surface coverings. 3,788,941, Cl. 161-182.000.

Kupsky, George Andrew, to Burroughs Corporation. Segment display panel with cathode groups. 3,787,940, Cl. 29-25.160.

Kurimoto, Masashi; and Yoshida, Mikihiko, to Hayashibara Company. Process for the preparation of amylose as the substrate for the quantitative analysis of amylase. 3,788,946, Cl. 195-31.00r.

Kuriyama, Yasuhisa: *See—*
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Kuroiwa, Katsumasa: *See—*
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Kurpanek, Waldemar Helmut. Magneto-motive bistable switching devices. 3,789,333, Cl. 335-207.000.

Kurz, Hanns; and Linder, Siegfried, to Bosch, Robert, G.m.b.H. Arrangement for electro-chemical treatment of an electrically conductive workpiece. 3,788,964, Cl. 204-224.00m.

Kyohuto Kaihatsu Kogyo Co., Ltd.: *See—*
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La Lande, William Alfred, Jr.; Hauptschein, Murray; and Hager, Robert Bonner, to Pennwalt Corporation. Dimers of hexafluoropropene and propylene. 3,789,088, Cl. 260-648.00f.

Laauwe, Robert H. Aerosol package. 3,788,521, Cl. 222-94.000.

Labalt Breweres of Canada, Limited: *See—*
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Laben, Wallace J.; and Tonkin, Kenneth J., to Dick, A. B., Company. Ink fountain trough with seals for fountain roller. 3,788,220, Cl. 101-363.000.

Lacroix, Jean Paul. Differential type driving wheels system. 3,788,420, Cl. 180-74.000.

Lacroix, Pierre, to Societe de Travaux d'Electricite et d'Electronique du Languedoc. Device for monitoring the electrical energy delivered by an energy source. 3,789,236, Cl. 307-96.000.

Lada, Mirko: *See—*
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Laing, Graham Sterling: *See—*
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L'Air Liquide Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude: *See—*
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Chauvet, Edmond; and Prevote, Andre, 3,788,634.
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Laird, J. Packard. Roll assembly. 3,788,391, Cl. 165-65.000.

Lajmeister, Bruce R.: *See—*
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Lakeland Enterprises, Inc., mesne: *See—*
Suchka, Michael B., 3,788,002.

Lambert, Daryl G., to Dia-Print Company, Inc., The. Adjustable screen printing chase. 3,788,216, Cl. 101-127.100.

Lambert, Daryl Gene, to Dia-Print Company, Inc., The. Printer with screen frame lift and squeegee support rivot means. 3,788,215, Cl. 101-123.000.

Lamphier, Walter C.: *See—*
Craig, Herbert C.; and Lamphier, Walter C., 3,789,277.

Landbrecht, Franz: *See—*
Greiner, Joachim; Engelsmann, Dieter; Gersch, Josef; Landbrecht, Franz; Muller, Rudolf; Wenger, Wolfgang; and Wiedemann, Otto, 3,789,157.

Landry, Norman Richard: *See—*
Dixon, Earl; and Landry, Norman Richard, 3,789,330.

Lane, Gerald H. Vehicle securing device. 3,788,109, Cl. 70-234.000.

Lane, Robert E., Jr., to Dow Chemical Company, The. Olefin oxidation catalyst. 3,789,063, Cl. 252-439.000.

Lange, Wilfried, to Bukama GmbH Hanover. Control valve assembly for a pneumatically operated stapler. 3,788,195, Cl. 91-457.000.

Langen & Company: *See—*
Wieland, Walter, 3,788,627.

Langenbach, Bob J., to Abex Corporation. Machine tool with angularly adjustable tone head. 3,788,761, Cl. 408-236.000.

Langhammer, Hans Jurgen: *See—*
Geck, Gunter; and Langhammer, Hans Jurgen, 3,788,837.

Lanier, Carroll W., to Ethyl Corporation. Process for the production of olefins. 3,789,081, Cl. 260-683.15d.

Lansky, Zdenek J.; and Claar, Leslie M., to Parker-Hannifin Corporation. Hydraulic system with series wound pump drive motor. 3,788,076, Cl. 60-452.000.

Lapinski, David A.: *See—*
Holm, John A.; and Lapinski, David A., 3,789,269.

Larcher, Angelo C. Protective headgear. 3,787,893, Cl. 2-3.00r.

Larsen, Arthur Bertel, to Bell Telephone Laboratories, Incorporated. Color camera system having complete spectral characteristics. 3,789,132, Cl. 178-5.4st.

Lashley, George D. Shoe shine apparatus. 3,787,917, Cl. 15-31.000.

Last, Hartmut: *See—*
Heiskel, Elmar; and Last, Hartmut, 3,789,028.

Laszlo, Joseph: *See—*
Califano, Frank L.; and Laszlo, Joseph, 3,788,925.

Lattke, Horst G., to Emhart Corporation. Blank insert mechanism for tray forming apparatus. 3,788,637, Cl. 271-13.000.

Lauerbach-Lehmeier, Robert: *See—*
Baumann, Reinhold; Kunze, Ernst-Gunter; Lauerbach-Lehmeier, Robert; Striebich, Alfred; and Rothe, Hans-Joachim, 3,789,026.

Laufhutte, Dieter: *See—*
Tippmer, Kurt; and Laufhutte, Dieter, 3,789,105.

Laurens, Stephen. Disposable cutaneous transjector. 3,788,315, Cl. 128-173.00h.

Lauterbach, William E., to Dale Refrigeration Company. Hot gas bypass system for a refrigeration system utilizing a plurality of eutectic plates. 3,788,093, Cl. 62-200.000.

Lawrence Security, Inc.: *See—*
Akers, Artie E., 3,789,384.

Lawrence, Walter F.: *See—*
Freedman, Norman S., granted to United States Atomic Energy Commission under the provision of 42 U.S.C. 2182; Horsting, Carel W.; Lawrence, Walter F.; and Carrona, John J., 3,787,958.

Le Roi, Marly: *See—*
Richard, Yves Robert; Le Roi, Marly; and Mignot, Jean Marcel, 3,788,981.

Leal, Victor Mario: *See—*

Rubio, Manuel; and Leal, Victor Mario, 3,788,139.

LeComte, Bernard; Henry, Jules; and Pincemin, Roger, to LeJoint Francias. Method for manufacturing washers from a flexible tube. 3,787,913, Cl. 10-86.00b.

Leder, Lewis B., to Xerox Corporation. Process for preparing glassy liquid crystals and method for forming images on same. 3,789,225, Cl. 250-331.000.

Lee, Charles M., Jr.: *See—*
Crandall, William B.; and Lee, Charles M., Jr., 3,788,874.

Lee, Conrad E., to Pako Corporation. Device for transporting film through a series of rollers. 3,788,153, Cl. 74-68.000.

Lee, Delbert R. Device for retrieving submerged golf balls and on driving range. 3,788,506, Cl. 214-356.000.

Lee, Emil B., Jr.: *See—*
Clancy, Lawrence F.; Lee, Emil B., Jr.; Smart, William O.; and Yancey, John W., 3,788,418.

Lee, George Dick, to Hitco. Structural acoustic transmission material. 3,788,937, Cl. 161-158.000.

Lee, Hanju; and Stahl, David E. Pressure equilization and purging system for heatless adsorption systems. 3,788,036, Cl. 55-25.000.

Lee, Raymond, Organization, Inc., The: *See—*
Lyon, George E., 3,787,993.
Thomson, John Ira; and Hensley, Ralph T., 3,788,573.
Willis, Floyd H., 3,788,417.

Lee, Seth, Jr. Fuel heat exchanger for internal combustion engine and method of use. 3,788,292, Cl. 123-122.00a.

Lee, Terry: *See—*
Johnson, Davis O.; and Lee, Terry, 3,788,684.

Lefebvre, Jacques: *See—*
Patrie, Jos; Lefebvre, Jacques; Segond, Roger; and Badia, Michel, 3,788,956.

Legal, Casimer C., Jr.: *See—*
Kolbe, John L.; and Legal, Casimer C., Jr., 3,788,817.

Lehikoinen, U. Albert, to Ethyl Corporation. Tracer incendiary materials including liquid alkylaluminum and compatible inorganic oxidizer. 3,788,907, Cl. 149-22.000.

Lehikoinen, U. Albert; and Franklin, Gerald, to Ethyl Corporation. Tracer incendiary composition of alkylaluminum inorganic oxidizer, and zirconium. 3,788,908, Cl. 149-42.000.

Lehmann, Werner, to Bauerle, Mathias, GmbH, Firma. Roller arrangement, in particular for paper folding, creasing and like machines. 3,788,638, Cl. 271-51.000.

Lehnhardt, Robert W., Jr.; and Schaefer, John O., to International Business Machines Corporation. Erase ribbon feed. 3,788,442, Cl. 197-181.000.

Lehrer, William I., to Fairchild Camera and Instrument Corporation. Method of preparing cavity envelopes by means of thin-film procedures. 3,788,723, Cl. 316-20.000.

Leichtl, Ludwig, to McCord Corporation. Bowden cable latch release mechanism. 3,788,685, Cl. 296-65.00a.

Leitz, Ernst, G.m.b.H.: *See—*
Loseries, Peter; and Hayashi, Toshio, 3,788,204.
Wiessner, Willi, 3,788,202.

LeJoint Francias: *See—*
LeComte, Bernard; Henry, Jules; and Pincemin, Roger, 3,787,913.

Lejon, Jean C. Self tracking beam accessible memory and addressing method therefor. 3,789,372, Cl. 340-173.0cr.

Leliaert, Raymond M.: *See—*
Fox, Everett D.; Schaefer, John P.; and Leliaert, Raymond M., 3,788,427.

Lemelson, Jerome H. Model airplane structures. 3,787,997, Cl. 46-78.000.

Lemelson, Jerome H. Automatic transfer and transport system. 3,788,500, Cl. 214-41.000.

Lemelson, Jerome H. Manipulation game. 3,788,641, Cl. 273-1.00m.

Lenaeris, George Victor; Laing, Graham Sterling; Morrell, Ronald Joseph; and Willis, Wesley Nelson, said Lenaerts, Morrell and said Willis assors. to Northern Electric Company Limited and said Laing assor. to Bell Northern Research Ltd. Terminal block. 3,79,348, Cl. 339-198.00r.

Lenhoff, John G., Jr., to Westinghouse Electric Corporation. Method and circuit for combining digital and analog signals. 3,789,389, Cl. 340-347.0ad.

Lentz, Robert A.: *See—*
Haith, Marshall M.; and Lentz, Robert A., 3,789,136.

Leonard, Lee V.: *See—*
Carpenter, Loyde M.; Kiser, James W.; and Leonard, Lee V., 3,789,177.

Leonhardt, Theodore C., to Devin, O. K., Inc. Dimensional picture frames. 3,787,992, Cl. 40-152.000.

Lerner, Nathan B., to Braun, W., Company. Liquid dispensing and metering device. 3,787,904, Cl. 4-227.000.

Lesca, Pier Carlo: *See—*
Bonzano, Giorgio; Lesca, Pier Carlo; and Ponzano, Luigi, 3,789,378.

Leutner, Volkmar; and Romes, Roman, to Bosch, Robert, G.m.b.H. Regulating apparatus for a hydrostatic pump. 3,788,775, Cl. 417-222.000.

Lever Brothers Company: *See—*
McKeown, Bamon; Metcalfe, John Leonard; and Pratt, Arthur James, 3,789,040.

Levi, George A., to Baker Perkins Inc. Baking apparatus. 3,788,799, Cl. 432-143.000.

Levinthal, Elon M., to RTC Industries, Inc. Support means for a display stand. 3,788,489, Cl. 211-163.000.

Levy, Leon B.; and Allen, George Cyrus, to Celanese Corporation. Surfactant in preparing solid catalysts. 3,789,018, Cl. 252-439.000.

Lewers, William G., to United States of America, National Aeronautics and Space Administration. Emergency master control valve. 3,788,390, Cl. 165-74.000.

Lewis, Elwood C. Skate wheel attachment. 3,789,208, Cl. 240-6.40r.

Lewis, Richard W.: *See—*
Henson, Alfred J.; and Lewis, Richard W., 3,789,198.

Lewis, Robert E.: *See—*
Raymond, David W.; Lewis, Robert E.; and Quigley, Robert E., 3,788,608.

Lewis, William E.: *See—*
Bearden, Roby, Jr.; MacMullin, Robert B.; Lewis, William E.; and Welty, Albert B., Jr., 3,788,978.

Lewis, William E.; and Paynter, John D., to Esso Research and Engineering Company. Iron ore reduction process <NU-9>. 3,788,835, Cl. 75-26.000.

Leyde, Warren L.: *See—*
Carpenter, Edward J.; and Leyde, Warren L., 3,789,201.

Libbey-Owens-Ford Company: *See—*
Malby, Robert E., Jr.; McComb, Walter D.; and Schave, Richard D., 3,788,750.

Licentia Patent Verwaltungs-G.m.b.H.: *See—*
Schimmer, Rigobert; and Messerschmidt, Jurgen, 3,788,895.

Licentia Patent-Verwaltungs-G.m.b.H.: *See—*
Haraszti, Tegze; and Grosholz, Rainer, 3,788,904.
Klossika, Walter, 3,787,966.
Rehm, Karl; and Schwarz, Hermann, 3,788,636.
Scherber, Werner, 3,788,894.

Lile, Derek L.; and Collins, David A., to United States of America, Navy. Thin film MIS storage diode. 3,789,369, Cl. 340-173.01s.

Lilly, Eli, and Company: *See—*
Kojiro, Katsuto; and Elliott, Robert A., 3,788,949.

Lim, Pedro K. External catheter device. 3,788,324, Cl. 128-295.000.

Linda, Frank Raymond, to International Paper Company. Method for hot gas activation of thermoplastic sealing surfaces. 3,788,917, Cl. 156-82.000.

Linde, Bjorn H:Son: *See—*
Martensson, Kjell Halvard; Linde, Bjorn H:Son; Palsson, Jan-Frederik; and Jerre, Sven Torsten, 3,788,033.

Linder, Siegfried: *See—*
Kurz, Hanns; and Linder, Siegfried, 3,788,964.

Lindsay, Harold W. Rotary cutter. 3,788,625, Cl. 266-105.00a.

Lindstrand, Bengt: *See—*
Netterstedt, Sture; and Lindstrand, Bengt, 3,789,181.

Lingemann, Heinz, to Fried. Krupp Gesellschaft mit beschrankter Haftung. Apparatus for forming packaged coils of wire. 3,788,210, Cl. 100-7.000.

Lion Fat and Oil Co., Ltd.: *See—*
Susuki, Rinnosuke; Hoshi, Hiroshi; and Umeya, Kaoru, 3,788,919.

Lipe Rollway Corporation: *See—*
Heanue, Paul T., 3,787,914.

Lippman, Aaron H., to Brainerd Manufacturing Co. Door lock. 3,788,107, Cl. 70-93.000.

Litke, Alvin Carl, to Allied Chemical Corporation. Paper dyed with water soluble benzothiazolylphenylazobarbituric acid dyestuffs. 3,788,802, Cl. 8-7.000.

Littmann, David, to Minnesota Mining and Manufacturing Company. Segment cutter. 3,787,968, Cl. 30-124.000.

Ljbrink, Eduard: *See—*
Piepers, Gijsbrecht Gerhardus; Vons, Leonard Hendrik; van der Linde, Aart; and Ljbrink, Eduard, 3,789,184.

Ljungdahl, Soren F. S.: *See—*
Knoos, Stellan; Ljungdahl, Soren F. S.; and Bostrom, Bertil Ingemar, 3,788,395.

Lloyd, Clarence Robert: *See—*
Neel, Robert M.; Lloyd, Clarence Robert; and Johnson, Robert C., 3,788,331.

Lloyd, Norman E.: *See—*
Thompson, Kenneth N.; Johnson, Richard A.; and Lloyd, Norman E., 3,788,945.

Lloyd, Richard L. Door locking means. 3,788,689, Cl. 292-304.000.

Lockheed Electronics Company: *See—*
Markowitz, Seymour, 3,789,371.

Lockheed Electronics Company, Inc.: *See—*
Norris, Kermit A., 3,789,377.

Loeck, Leslie M.: *See—*
Fusari, Salvatore A.; and Loeck, Leslie M., 3,789,119.

Loessi, Jack C.: *See—*
Hoffman, Eric J.; and Loessi, Jack C., 3,789,303.

Loewen, Jacob L. Foldable table and bench assembly. 3,788,696, Cl. 297-159.000.

Loew's Theatres, Inc.: *See—*
Kirschstein, Werner P.; and Wagner, John R., 3,788,125.

Logan, Hubert. Remote control starting device for internal combustion engine. 3,788,294, Cl. 123-179.0bg.

Logan, John S.: *See—*
Colovas, Denny D.; Logan, John S.; and Skruch, Richard R., 3,788,233.

Lohrberg, Karl: *See—*
Muller, Jurgen; and Lohrberg, Karl, 3,788,968.

Long, Jack B.: *See—*

Krawetz, Barton; Long, Jack B.; and Mooney, Leonard J., 3,789,321.

Longbottom, David Melvin: *See*—
Hoyle, Geoffrey; and Longbottom, David Melvin, 3,788,381.

Longi, Paolo; Cameli, Nazzareno; Valvassori, Alberto; Parodi, Sandro; and Cervi, Remo, to Montecatini Edison S.p.A. Process for preparing saturated and unsaturated elastomeric copolymers of ethylene and/or higher alpha-olefins. 3,789,036, Cl. 260-80.700.

Loovist, Kaj Ragnar, to Fagersta Aktiebolag. Roller for hot and cold rolling and method of making the same. 3,787,943, Cl. 29-125.000.

Lorenz, Howard I.; and Rosser, Eugene P., said Rosser assor. to Noble Drilling Corporation. Method and arrangement for protecting and guiding drilling bits. 3,788,407, Cl. 175-317.000.

Loricchio, Domingos, to Carborundum Company. Process and compositions of rubber vulcanizates with silicone polymerizates. 3,789,050, Cl. 260-41.50r.

Lorke, Horst: *See*—
Diery, Helmut; Rittner, Siegbert; and Lorke, Horst, 3,788,991.

Loseries, Peter; and Hayashi, Toshio, to Minolta Camera Co., Ltd. and Leitz, Ernst, G.m.b.H. Swinging-sector camera shutter with warning indicator. 3,788,204, Cl. 95-55.000.

Losfeld, Andre. Universal projectile. 3,788,230, Cl. 102-74.000.

Lossie, Robert A. Flexible hose connector. 3,788,676, Cl. 285-247.000.

Lotan, Amram Zvi: *See*—
Jen, Dixson Teh-Chao; and Lotan, Amram Zvi, 3,789,365.

Lotz, Horst K., to Ge Ga Gesellschaft fur Gasetechnik Lotz KG. Device for supporting a horizontally positioned strand in a continuous casting plant. 3,788,620, Cl. 266-23.00r.

Love, Leonard Sidney. Treatment apparatus. 3,788,477, Cl. 210-195.000.

Love, Olen J., to Malone, H. H. and Malone, Gary. Fish hook setter. 3,787,994, Cl. 43-115.000.

Lovejoy, Curtis N.: *See*—
Kosowsky, Leo N.; Lovejoy, Curtis N.; and Cunniff, John G., 3,788,963.

Lowdenslager, John R., to Singer Company, The, mesne. Digital phase locked loop. 3,789,308, Cl. 328-155.000.

Lowell, Francis C.; Rorline, Matthew; Rosenberg, Paul; and Sax, Robert E., to Research Frontiers, Inc. Thermal convection flow light valve. 3,788,729, Cl. 350-160.00r.

Lucas, James M.: *See*—
Teng, James; Lucas, James M.; and Pyler, Richard E., 3,788,984.

Lugowski, Ronald J.; and Sciacero, Rinaldo, to Qonaar Corporation. Extended time meter construction. 3,788,439, Cl. 194-61.000.

Lukas, George N. Work-positioning table. 3,788,632, Cl. 169-20.000.

Lund, Charles M.: *See*—
Frantzen, John J.; and Lund, Charles M., 3,788,912.

Lundborg, Gunnar: *See*—
Fahlman, Gosta H.; Lundborg, Gunnar; and Westberg, Johan Eric Hayden, 3,788,311.

Lundgren, Jens Ove, to Rorkonsult for Fjarrvarne i Orebio AB. Method of fitting piping for a hot or cold fluid. 3,788,083, Cl. 61-72.100.

Lundstrom, Ronald H.: *See*—
Hawthorne, Vaughn I.; and Lundstrom, Ronald H., 3,788,493.

Lunsford, Max W.: *See*—
Harrison, Robert S.; and Lunsford, Max W., 3,788,288.

Luscher, Walter: *See*—
Geng, Peter; Gueniat, Robert; Zollinger, Alfred; Luscher, Walter; Schawalder, Hansjorg; and Tschanen, Hanspeter, 3,788,368.

Lyle, Phra D.: *See*—
Klink, Jerome P.; Lyle, Phra D.; and Griffith, Terry L., 3,788,826.

Lynch, William M.: *See*—
Keenan, Michael G.; Lynch, William M.; and Priedigkeit, John H., 3,789,412.

Lyon, George E., 10% to Lee, Raymond, Organization, Inc., The. Colored coded gas container bands. 3,787,993, Cl. 40-306.000.

Lyon, Ralph L.: *See*—
Lyon, Richard S.; and Lyon, Ralph L., 3,789,109.

Lyon, Richard S.; and Lyon, Ralph L., to United McGill Corporation. Method for cleaning a gas. 3,789,109, Cl. 423-481.000.

Lyon, William B.; and Schaeffer, William D., to Graphic Arts Technical Foundation. Methods and apparatus for paper testing. 3,788,137, Cl. 73-159.000.

M & T Chemicals, Inc.: *See*—
Reifenberg, Gerald H.; and Gitlitz, Melvin H., 3,789,057.

MacAlpine, Alexander D. Kick stand. 3,788,671, Cl. 280-303.000.

Macchi, Romualdo. Assembly method for beam structures. 3,788,023, Cl. 52-741.000.

Machine Tools Limited: *See*—
Firth, Arthur Jose, 3,788,158.

Machleidt, Hans: *See*—
Kruger, Gerd; Zipp, Otmar; Keck, Johannes; Nickl, Josef; Machleidt, Hans; Ohnacker, Gerhard; Engelhorn, Robert; and Puschmann, Sigfrid, 3,789,125.

Mack Trucks, Inc.: *See*—
Carlson, Paul E.; and Schimmel, Ralph U., 3,788,157.

MacKay, James D.: *See*—
Gade, John N.; and MacKay, James D., 3,787,954.

MacKenzie, George D., to TRW, Inc. Resistance material and electrical resistor made therefrom. 3,788,997, Cl. 252-63.500.

MacMullin, Robert B.: *See*—
Bearden, Roby, Jr.; MacMullin, Robert B.; Lewis, William E.; and Welty, Albert B., Jr., 3,788,978.

Macoit, Arthur J.; and Apostoleris, Theodore G., to Ford Motor Company. Permanent magnet dynamoelectric machine. 3,789,250, Cl. 310-154.000.

Mader, Siegfried R.; and Matthews, John W., to International Business Machines Corporation. Method of preparing dislocation crystals. 3,788,890, Cl. 117-201.000.

Madjid, Abdul Hamid; Vaala, Allen R.; Anderson, Walter F., Jr.; and Pedulla, Joseph, Jr., to Research Corporation. Method for growing crystals using a semipermeable membrane. 3,788,818, Cl. 23-300.000.

Maeda, Riichi, to Nissan Motor Company, Limited. Valve for abruptly relieving fluid under pressure. 3,788,596, Cl. 251-69.000.

Maffitt, Kent N.: *See*—
Bari, Jaime A.; Maffitt, Kent N.; and Sievers, Jerry A., 3,789,370.

Magnan, Regis: *See*—
Chaurand, Patrice; Magnan, Regis; and Coquery, Jean-Paul, 3,789,111.

Magnetic Seal Corporation: *See*—
Place, Bruce S., 3,788,650.

Maguire, Lawrence A.: *See*—
Andersen, Robert A.; and Maguire, Lawrence A., 3,789,323.

Maheux, Peter Francis, to Bell-Northern Research Ltd. Electrical connector. 3,789,342, Cl. 339-17.00f.

Mahlmann, James Patrick, to General Foods Corporation. Process for producing coffee extract. 3,788,860, Cl. 426-433.000.

Maier, Ludwig, to Monsanto Company. Halovinylene-1,2-bis(phosphonic esters). 3,789,092, Cl. 260-932.000.

Maison, Francois P.: *See*—
Bataille, Roger; Maison, Francois P.; and Curvale, Pierre Paul, 3,789,411.

Major, Norman Lionel, to Bell Telephone Laboratories, Incorporated. Overload monitor for transmission systems. 3,789,146, Cl. 179-15.0bf.

Majorino, Vincent. Elapsed time recorder. 3,789,424, Cl. 346-95.000.

Malancy, Samuel T.; and McManers, John W., to Underwood, William, Company. Maintaining the water level in baking beans. 3,788,302, Cl. 126-374.000.

Malaviya, Shashi Dhar, to International Business Machines Corporation. Method and apparatus for measuring the parameters of a transistor or other two-port device at microwave frequencies. 3,789,301, Cl. 324-158.00t.

Malby, Robert E., Jr.; McComb, Walter D.; and Schave, Richard D., to Libbey-Owens-Ford Company. Inspecting glass. 3,788,750, Cl. 356-239.000.

Malkin, Irving: *See*—
Schenker, Barry A.; Malkin, Irving; and Taylor, Kirman, 3,789,022.

Malm, Marvin Forest, to International Telephone and Telegraph Corporation. Call park circuit for an automatic telephone switching system: 3,789,153, Cl. 179-27.00d.

Malone, Gary: *See*—
Love, Olen J., 3,787,994.

Malone, H. H.: *See*—
Love, Olen J., 3,787,994.

Mancebo, Lloyd, to United States of America, Atomic Energy Commission. High-emission cold cathode. 3,789,310, Cl. 330-4.300.

Manco Mfg. Co.: *See*—
Valente, Raymond L.; and Bonomo, Otto A., 3,787,947.

Mandley, Donald J., to General Motors Corporation. Multiple hardness O-rings. 3,788,654, Cl. 277-229.000.

Manierre, Robert L.: *See*—
Wakeman, Alfred W.; and Manierre, Robert L., 3,788,574.

Marathon Oil Company: *See*—
Presley, C. Travis; Argabright, Perry; and Smith, Ronald E., 3,789,010.

Marconi Company Limited, The: *See*—
Blount, Eric Albert, 3,789,218.

Marcovitch, Jacob, to Rotary Profile Anstalt. Apparatus for and method of rolling articles. 3,788,114, Cl. 72-83.000.

Marforio, Nerino, to Rimoldi, Virginio, & C., S.p.A. Sewing apparatus with automatic workpieces stacking means. 3,788,248, Cl. 112-121.290.

Marforio, Nerino, to Rimoldi, Virginio, & C., S.p.A. Lubricant purification filter for sewing machines. 3,788,252, Cl. 112-256.000.

Margerum, John D., to Hughes Aircraft Company. Photopolymerization systems with tetrazolium salt. 3,788,858, Cl. 96-115.00p.

Mariner, Ralph E. Stringed instrument with a sounding plate. 3,788,183, Cl. 84-291.000.

Markaris, Michael J.: *See*—
Vartanian, Perry H., Jr.; Markaris, Michael J.; and Anderson, Carl P., 3,788,441.

Markewitz, Wolfgang; and Mischke, Fritz, to Fa. Hunnebeck GmbH. Apparatus to facilitate the extraction of a room form. 3,788,494, Cl. 214-1.00h.

Markey, Francis J., to General Motors Corporation. Pedal travel measuring tool. 3,788,131, Cl. 73-132.000.

Markley, Finley W., to United States of America, Atomic Energy Commission. Folded membrane dialyzer. 3,788,482, Cl. 210-321.000.

Markowitz, Seymour, to Lockheed Electronics Company. MOSFET memory cell. 3,789,371, Cl. 340-174.00r.

Markowski, Stanley J., to United Aircraft Corporation. Annular combustion chamber for dissimilar fluids in swirling flow relationship. 3,788,065, Cl. 60-39.020.

Marrero, Michael T., to United States of America, Navy. Tone burst to frequency converter. 3,789,305, Cl. 328-140.000.

Marsh, Barry T., to Dresser Industries, Inc. Leak detection apparatus. 3,788,127, Cl. 73-40.000.

Marsh, Paul G., to Black Clawson Fiberclaim, Inc., mesne. Recovery of salvageable components from waste material. 3,788,568, Cl. 241-69.000.

Marsh, Robert L. Protective jacket and base for pressure vessel. 3,788,511, Cl. 220-9.00r.

Marsh Stencil Machine Company: *See—*
Rabelow, Harold H., 3,788,217.

Marshall, David M.: *See—*
Krippene, Brett C.; Peterson, Morris W.; and Marshall, David M., 3,788,796.

Martensson, Kjell Halvard; Linde, Bjorn H:Son; Palsson, Jan-Frederik; and Jerre, Sven Torsten, to Tetra Pak International AB. Packaging machine. 3,788,033, Cl. 53-186.000.

Marti, Milford F. Electrical brake assembly. 3,788,432, Cl. 188-138.000.

Martin Engineering Company: *See—*
Matson, Carl G., 3,788,527.

Martin, Helmut, to Kabel- und Metallwerke Gutehoffnungshutte Aktiengesellschaft. Process and apparatus for forming annular corrugations in metal tubing. 3,788,113, Cl. 72-77.000.

Martin Marietta Corporation: *See—*
Johnson, Gerald E., 3,789,329.

Maruyama, Koichi: *See—*
Yamazaki, Eiich; Maruyama, Koichi; and Ueda, Toshio, 3,788,200.

Maryland Cup Corporation: *See—*
Ruff, Stanley, 3,788,463.

Maschinenfabrik & Gresserei Netstal A.G.: *See—*
Munz, Paul, 3,788,791.

Masic, Rene: *See—*
Kervizic, Jacques; Masic, Rene; Shroff, Arvind; and Warnecke, Robert Jean, 3,789,253.

Mason, H. C., & Associates, Inc.: *See—*
Mason, Howard C., 3,788,371.

Mason, Howard C., to Mason, H. C., & Associates, Inc. Saw apparatus with disk bed support for lumber. 3,788,371, Cl. 144-312.000.

Mason, Ralph B.: *See—*
Buchmann, Fred J.; Eidt, Clarence M., Jr.; Mason, Ralph B.; and Hamner, Glen P., 3,788,974.

Mason, Wylie A., Jr. Multiple panel laminating press. 3,788,211, Cl. 100-93.00p.

Massaccesi, Raymond A., to All-Steel Inc. Chair construction. 3,788,701, Cl. 297-455.000.

Massachusetts Institute of Technology: *See—*
Waldron, Richard A.; and Stern, Ernest (said Stern assor. to), 3,789,327.
Wilson, David G.; and Smith, Ora E., 3,788,466.

Masseron, Alain Olivier Felix. Stabiliser apparatus for multi-directional movement of a camera. 3,788,585, Cl. 248-178.000.

Massey-Ferguson (Australia) Limited: *See—*
Stiff, Rodney Allan; and Ruback, Keith Leonard, 3,788,048.

Massey-Ferguson, Inc.: *See—*
Beebe, Raymond A., 3,788,518.

Master Specialties Company: *See—*
Doyle, James H., 3,789,144.

Masuda, Noboru, to Denki Onkyo Co., Ltd. Hall effect device. 3,789,311, Cl. 330-6.000.

Mathes, Homer B.: *See—*
Price, Edward W.; and Mathes, Homer B., 3,788,126.

Mathews, Frederic M., to Honeywell Inc. Automatically releasable arrow holding device for a crossbow. 3,788,299, Cl. 124-35.00r.

Matlen, Abraham J.: *See—*
Orosy, David J.; and Matlen, Abraham J., 3,789,190.

Matras, Earl L.; Matras, Frank D.; and Herad, Donald J., to Frabill Manufacturing Co. Basketball backboard and coal structure. 3,788,642, Cl. 273-1.50r.

Matras, Frank D.: *See—*
Matras, Earl L.; Matras, Frank D.; and Herad, Donald J., 3,788,642.

Matson, Carl G., to Martin Engineering Company. Quick-Release aerator for introducing high pressure air into a container to facilitate dispensing. 3,788,527, Cl. 222-195.000.

Matsukawa, Hiroharu; Saeki, Keiso; and Katayama, Shizuo, to Fuji Photo Film Co., Ltd. Process for producing microcapsules containing oily hydrophobic liquid. 3,789,015, Cl. 252-316.000.

Matsumoto, Tsuyoshi, to Mitsubishi Denki Kabushiki Kaisha. Inertia sliding type internal combustion engine starter. 3,788,150, Cl. 74-7.00r.

Matsumura, Shiro; Shin, Hiroshi; Sugano, Junichiro; Yoshii, Tadashi; Kuriyama, Yasuhisa; and Komaki, Takeshi, to Mitsubishi Gas Chemical Company, Inc. Process for preparing a highly selective catalyst used in the production of hydrogen peroxide. 3,789,115, Cl. 423-588.000.

Matsumura, Toshio: *See—*
Hashimoto, Hiroshi; and Matsumura, Toshio, 3,788,822.

Matsumura, Wakuo, to Unitika Kabushiki Kaisha. Apparatus for producing undrawn polyamide films having uniform physical characteristics. 3,788,789, Cl. 425-230.000.

Matsuo Electric Company: *See—*
Tomiwa, Hiroshi, 3,787,961.

Matsushima, Hiromi, to Colorfax Company, Limited. Electro-sensitive recording medium having a plurality of a recording layers. 3,789,425, Cl. 346-135.000.

Matsushita Electric Industrial Co., Ltd.: *See—*
Haagensen, Duane B., 3,789,179.

Matsuzawa, Teruyuki: *See—*
Saito, Yoshihiro; Okada, Tomoo; Odera, Eiichi; and Matsuzawa, Teruyuki, 3,789,147.

Mattel, Inc.: *See—*
Ayton, Ian F.; Hartling, Donald C.; Kossoff, Joseph; and Osborne, Brian G., 3,787,999.
Kilroy, Eugene J., Jr.; Du Breuil, Philip B.; and Dennison, Scott C., 3,787,998.

Matter, William L.; and Gomer, William T., to Mead Johnson & Company. Sulfamoyl azide process and composition for lowering blood pressure. 3,789,120, Cl. 424-226.000.

Mattheis, Friedrich Karl: *See—*
Bindernagel, Ali; and Mattheis, Friedrich Karl, 3,787,942.

Matthews, Jamie F., Jr., to Esso Production Research Company. Recovery of marine pipelines. 3,788,084, Cl. 61-73.300.

Matthews, John W.: *See—*
Mader, Siegfried R.; and Matthews, John W., 3,788,890.

May, Paul Hillard, to Bell Telephone Laboratories, Incorporated. Gated dividing circuit with reduced time variation between gating and an output signal. 3,789,304, Cl. 328-41.000.

Mayaud, Edith Ellen; and Pearlman, Samuel, to RCA Corporation. Method for printing negative tolerance matrix screen structure for a cathode-ray tube. 3,788,846, Cl. 96-36.000.

Mayfield, Lawrence T.: *See—*
Mayfield, Robert W.; and Mayfield, Lawrence T., 3,788,797.

Mayfield, Robert W.; and Mayfield, Lawrence T. Fuel oil burner lead control mechanism. 3,788,797, Cl. 431-186.000.

McCabe-Powers Body Company: *See—*
Balogh, Roy, 3,788,425.

McCauley, Albert P., to SCM Corporation. Control method for fume incinerators. 3,789,104, Cl. 423-210.000.

McClocklin, Samuel B., to Owatonna Tool Company. Hydraulic system. 3,788,781, Cl. 417-401.000.

McCloskey, Albert R., to Heim Universal Corporation. Ball bearing assembly. 3,788,708, Cl. 308-6.00c.

McComb, Walter D.: *See—*
Malby, Robert E., Jr.; McComb, Walter D.; and Schave, Richard D., 3,788,750.

McCombs, Jay. Flush tank water-regulating attachment. 3,787,902, Cl. 4-67.00a.

McCord Corporation: *See—*
Leichtl, Ludwig, 3,788,685.

McCormick, James B., to Pelam, Inc. Expandable sponge pad electrode for use with a electrocardiograph instrument or the like. 3,788,317, Cl. 128-2.06e.

McCoy, Frederic C., to Texaco Inc. Solubilizing process. 3,789,003, Cl. 252-127.000.

McCulloch Corporation: *See—*
Anderson, Harold E., 3,788,293.
Jackson, Robert V., 3,789,229.

McDermott, David C.; and Seymour, Errol V., to Shell Oil Company. Integrated barge tow with recessed bottom. 3,788,263, Cl. 114-235.00r.

McDonnell, Douglas, Corporation: *See—*
Chester, Frank S.; Johnson, Claude O.; Kavanagh, Ira Keith; and van Horik, Leonard R., 3,788,117.
Gumbelevicius, John, 3,788,914.
Harenberg, Harold L., Jr.; and Shannon, James H., 3,789,356.
Waters, Elmer Dale, 3,788,389.

McDowell-Wellman Engineering Company: *See—*
Mercer, James R., 3,788,522.

McDuffee, Paul E., Sr. Fender mounted rear view mirror. 3,788,734, Cl. 350-289.000.

McGee, Thomas D., to Iowa State University Research Foundation. Artificial bone or tooth prosthesis material. 3,787,900, Cl. 3-1.000.

McGowen, Harold E., Jr.: *See—*
Terral, Ben D.; and McGowen, Harold E., Jr., 3,788,397.

McGraw-Edison Company: *See—*
Schmidt, Jacob E., 3,788,900.

McInteer, Berthus B.: *See—*
Goldblatt, Maxwell; and McInteer, Berthus B., 3,788,814.

McKeown, Bamon; Metcalfe, John Leonard; and Pratt, Arthur James, to Lever Brothers Company. Product for the treatment of cellulosic fabrics to improve coarse substance. 3,789,040, Cl. 260-17.300.

McLean, Robert E., to Rival Manufacturing Company. Can opener with power pierce, automatic shut-off, and removable cutter mounting plate. 3,787,967, Cl. 30-4.00r.

McManers, John W.: *See—*
Malaney, Samuel T.; and McManers, John W., 3,788,302.

McMillan, Ian; and Prest, Jeffrey, to Imperial Chemical Industries Limited. Solvent compositions. 3,789,004, Cl. 252-171.000.

McMillan, Ian; and Prest, Jeffrey, to Imperial Chemical Industries Limited. Solvent compositions. 3,789,005, Cl. 252-171.000.

McMillan, Ian; and Prest, Jeffrey, to Imperial Chemical Industries Limited. Solvent compositions. 3,789,006, Cl. 252-171.000.

McMillen, Kenneth G.: *See—*
Holdeman, John W.; and McMillen, Kenneth G., 3,788,075.
Johnson, Raymond E.; Miller, Wendell E.; and McMillen, Kenneth G., 3,788,077.

McMillen, Leanne S.: *See—*
Holdeman, John W.; and McMillen, Kenneth G., 3,788,075.
Johnson, Raymond E.; Miller, Wendell E.; and McMillen, Kenneth G., 3,788,077.

McMullen, Earl Wayne, to Hastings Fiber Glass Products, Inc. Shotgun stick. 3,788,691, Cl. 294-19.00r.

McNally, Donald E., to Steelcase Inc. Torsion rod chair iron. 3,788,586, Cl. 248-373.000.

McNaughton, Andrew; and Hutchison, Bruce D. Protective appliance for use during painting. 3,788,274, Cl. 118-506.000.

McNeil, John A. Vortex flash separator. 3,788,044, Cl. 55-204.000.

McNulty, Edward R.: *See—*
Bell, David F.; Johari, Girish C.; and McNulty, Edward R., 3,789,289.

McQueen, Edwin D.; and Spicer, Thomas L., to Teletype Corporation. Tiltable display screen assembly. 3,789,140, Cl. 178-7.810.

McWilliams, Joseph E. Steering control for power driven mobile conveyors. 3,788,444, Cl. 198-2.000.

McWilliams, Joseph E. Balanced extendible mobile conveyor. 3,788,452, Cl. 198-139.000.

Mead Corporation, The: *See—*
Morphis, Charles W.; and Hilburn, Bennie D., 3,787,951.

Mead Johnson & Company: *See—*
Matter, William L.; and Gomer, William T., 3,789,120.

Measuregraph Company, The: *See—*
Somogye, Steve, Jr., 3,787,981.

Mech, Christian Andre Lucien: *See—*
Hirtz, Alfred Georges Jean; and Mech, Christian Andre Lucien, 3,788,652.

Medill, David Gordon; and O'Neill, John Francis, to Bell Telephone Laboratories, Incorporated. Data format converter. 3,789,152, Cl. 179-99.000.

Medill, David Gordon, to Bell Telephone Laboratories, Incorporated. Switchhook status signaling arrangement. 3,789,154, Cl. 179-99.000.

Mednick, Leo; deceased (by Shipon, Shirley S.; executrix). Drapery. 3,788,376, Cl. 160-19.000.

Medtronic, Inc.: *See—*
Friedman, Harry G., 3,788,329.

Medwin, Albert H., to Ragen Semiconductor, Inc. Apparatus for providing a pulsed liquid crystal display. 3,789,388, Cl. 340-336.000.

Mee Industries, Inc.: *See—*
Mee, Thomas R., 3,788,542.

Mee, Jack E.; and Besser, Paul J., to North American Rockwell Corporation. Method for producing bubble domains in magnetic film-substrate structures. 3,788,896, Cl. 117-235.000.

Mee, Thomas R., to Mee Industries, Inc. Environmental control method and apparatus. 3,788,542, Cl. 239-2.00r.

Meek, Harry M.: *See—*
Miner, Robert J.; and Meek, Harry M., 3,788,829.

Mefina S.A.: *See—*
Simmen, Robert; and Chabloz, Olivier, 3,788,229.

Meier, Carl H.; and White, Robert P., to Gulf & Western Industries, Inc. Digital counter and timer with multiplex setting and readout. 3,789,195, Cl. 235-92.00t.

Meier, Eugen: *See—*
Allenspach, Heinz; and Meier, Eugen, 3,788,410.

Meier, Eugen, to Mettler Instrumente, AG. Temperature compensated measuring apparatus. 3,788,134, Cl. 73-141.0ab.

Meincer, John H., to Owens-Illinois, Inc. Unitized palletless load. 3,788,462, Cl. 206-65.00s.

Meininger, Fritz: *See—*
Hille, Ernst; Hoyer, Ernst; Meininger, Fritz; and Rottmann, Johannes, 3,788,801.

Meister, Cornelius: *See—*
Pelmulder, John P.; Meister, Cornelius; and Monroe, Darrell W., 3,788,470.

Mencacci, Samuel A.: *See—*
Abbott, John A.; and Mencacci, Samuel A., 3,788,392.

Mencacci, Samuel A., to FMC Corporation. Evaporator having moving heat exchange tubes. 3,788,375, Cl. 159-25.00a.

Mengel, Lloyd A., to Eastman Kodak Company. Apparatus for piercing a container. 3,788,519, Cl. 222-83.500.

Menke, Franz, to Eltro GmbH & Company. Method for measuring range of vision. 3,788,745, Cl. 356-104.000.

Mensenkamp, Ewald; and Cordes, Phil Heinrich, to Stahlwerke Peine-Salzgitter AG. Method of inhibiting corrosion of metal surfaces. 3,788,880, Cl. 117-70.00s.

Menzi, Ulrich, to Paillard S.A. Character selection and impression control mechanism for typewriter. 3,788,443, Cl. 197-16.000.

Mercer, James R., to McDowell-Wellman Engineering Company. Nozzle structure for injection molding machine. 3,788,522, Cl. 222-146.00r.

Merrill, Stewart Henry: *See—*
Stahly, Frederick August; and Merrill, Stewart Henry, 3,788,995.

Merritt, Edward E., to Federal Cartridge Corporation. Nested wad column and method of shot shell loading. 3,788,224, Cl. 102-42.00c.

Messenger, Joseph U., to Mobil Oil Corporation. Lost circulation control. 3,788,406, Cl. 175-72.000.

Messerschmidt, Jurgen: *See—*
Schimmer, Rigobert; and Messerschmidt, Jurgen, 3,788,895.

Messerschmitt-Bolkow-Blohm Gesellschaft mit beschrankter Haftung: *See—*
Held, Manfred, 3,788,225.
Schmidt, Gunther, 3,788,069.

Messersmith, Eugene, to Synthane-Taylor Corporation. Pawl bar assembly. 3,788,460, Cl. 198-221.000.

Messrs. Neumo Armaturenfabrik Apparatebau Metallgiesserei GmbH: *See—*
Carossino, Andre, 3,787,972.

Metaframe Corporation: *See—*
Willinger, Allan H.; and Dinnerstein, Albert J., 3,788,277.

Metallgesellschaft Aktiengesellschaft: *See—*
Dorr, Karl-Heinz; Grimm, Hugo; and Kola, Rolf, 3,788,043.
Muller, Jurgen; and Lohrberg, Karl, 3,788,968.

Metcalfe, John Leonard: *See—*
McKeown, Bamon; Metcalfe, John Leonard; and Pratt, Arthur James, 3,789,040.

Mettler Instrumente, AG: *See—*
Meier, Eugen, 3,788,134.

Mettler Instruments Co., AG: *See—*
Allenspach, Heinz; and Meier, Eugen, 3,788,410.

Metz, Emile: *See—*
Metz, Paul; and Metz, Emile, 3,788,383.

Metz, Paul; and Metz, Emile, to Acieries Reunies de Burbach-Eich-Dudelange S.A. Apparatus for the continuous extraction of electroslag remelted metals. 3,788,383, Cl. 164-156.000.

Meyer, Earl W., Jr.; Carter, Ivor W.; and Scott, Ian J. C., to Chrysler Corporation. Ignition distributor device with insulative shutter type rotor. 3,789,168, Cl. 200-19.00r.

Meyer, Robert J.; and Westacott, Harry L., to Eastman Kodak Company. Liquid circulation apparatus. 3,788,349, Cl. 137-565.000.

Michaels, Alan S., to Alza Corporation. Drug delivery device with means for maintaining device in environment of use. 3,788,322, Cl. 128-260.000.

Michaelson, Henry W.: *See—*
Eannarino, Joseph M.; Granieri, Michael S., Jr.; and Michaelson, Henry W., 3,788,517.

Michels, Hans, to Siemens Aktiengesellschaft. Electro-mechanical position indicator. 3,789,395, Cl. 340-373.00r.

Microwave Associates, Inc.: *See—*
Rearwin, Richard H.; and Collins, Fred P., 3,789,302.

Middleman, David, to Koppers Company, Inc. Method and apparatus for guiding and tensioning a web. 3,788,515, Cl. 226-1.000.

Middleton, Horace; and Tominc, Frank, to Salem Corporation. Rabble for rotary hearth furnace. 3,788,800, Cl. 432-235.000.

Mignot, Jean Marcel: *See—*
Richard, Yves Robert; Le Roi, Marly; and Mignot, Jean Marcel, 3,788,981.

Mihulowicz, George: *See—*
Buelow, William H.; Mohrbacker, William J.; and Mihulowicz, George, 3,788,610.

Mila, Jose Antonio: *See—*
Balchunas, William Clement; and Mila, Jose Antonio, 3,789,295.

Miles, Wilbur N.: *See—*
Benjamin, Milton L.; Walker, David D.; and Miles, Wilbur N., 3,788,658.

Milette, Kenneth A.; Uyeda, Tom M.; and Quintana, Elias D., to International Telephone and Telegraph Corporation. Vacuum breaker valve. 3,788,342, Cl. 137-218.000.

Milewski, John V.: *See—*
Shyne, James J.; and Milewski, John V., 3,788,935.

Milgram, Alvin A., to Panel Technology Inc., mesne. Process for producing a gaseous breakdown display device. 3,788,722, Cl. 316-19.000.

Mill, Rolf K.: *See—*
Sternberg, Ronald Frederick; Koppelmann, Roger Fred; and Mill, Rolf K., 3,789,354.

Millar Elevator Industries, Inc.: *See—*
Fried, David W., 3,788,428.

Miller, Arthur W.; Stuemky, Robert E.; and Morse, George E., to Gates Rubber Company, The. End cap for flexible shaft couplings and method. 3,788,098, Cl. 64-11.00r.

Miller Brewing Company: *See—*
Kuenzi, William A., 3,788,538.

Miller, David T., to Statham Instruments, Inc. Thermodynamic cycles. 3,788,091, Cl. 62-175.000.

Miller, David T., to Statham Instruments, Inc. Thermodynamic cycles. 3,788,092, Cl. 62-175.000.

Miller, Donald L., to Bendix Corporation, The. Flexible coupling. 3,788,099, Cl. 64-12.000.

Miller, Edward F.: *See—*
Chafetz, Harry; Cullen, William P.; and Miller, Edward F., 3,789,076.

Miller, Glenn A., to Goodyear Tire & Rubber Company, The. Hose manufacture. 3,787,956, Cl. 29-451.000.

Miller, Herman, Research Corporation: *See—*
Propst, Robert L.; and Propst, Howard B., 3,788,276.
Propst, Robert L.; and Propst, Howard B., 3,788,278.

Miller, Kenneth H., to Carrier Corporation. Electrodynamic linear motor operated gas compressor. 3,788,778, Cl. 417-417.000.

Miller, Leo C. Stair traversing mechanism for hand truck. 3,788,413, Cl. 180-8.00a.

Miller, Lester I., to Du Pont de Nemours, E. I., and Company. Thermosetting coating composition of an alkyd resin mixture and aliphatic polyisocyanate cross-linking agent. 3,789,037, Cl. 260-16.000.

Miller, Marjorie A. Urine shield. 3,787,903, Cl. 4-134.000.

Miller, Reginald T. Fin-keel catamaran. 3,788,257, Cl. 114-39.000.

Miller, Robert F., to Modine Manufacturing Company. Air moving means drive system. 3,789,284, Cl. 318-377.000.

Miller, Stephen A.: *See—*
Smith, John A.; and Miller, Stephen A., 3,787,996.
Miller, Timothy W., to Bethlehem Steel Corporation. Immersion bell. 3,788,624, Cl. 266-34.00t.
Miller, Wendell E.: *See—*
Johnson, Raymond E.; Miller, Wendell E.; and McMillen, Kenneth G., 3,788,077.
Millmaster Onyx Corporation: *See—*
Adams, Phillip; and Petrocci, Alfonso N., 3,788,989.
Milwaukee Faucets, Inc.: *See—*
Schmitt, William C., 3,788,601.
Mimino, Tohru; Nara, Shuuroku; Miyashita, Yoshio; and Nishikawa, Katsuhiko, to Nippon Kokan Kabushiki Kaisha. Steel having improved free-cutting properties. 3,788,843, Cl. 75-124.000.
Miner, Carroll R., to General Instrument Corporation. Indexed TV tuner. 3,788,152, Cl. 74-10.150.
Miner, Carroll R.; and Balash, Edward, to General Instrument Corporation. Vernier tuning means for UHF tuner or the like. 3,789,331, Cl. 334-82.000.
Miner, Robert J.; and Meek, Harry M., to Owens-Illinois, Inc. Method for making glassware. 3,788,829, Cl. 65-79.000.
Minnesota Mining and Manufacturing Company: *See—*
Bari, Jaime A.; Maffitt, Kent N.; and Sievers, Jerry A., 3,789,370.
Beck, Warren R.; and Sweeny, Norman P., 3,787,908.
Bergstrom, Theodore R., 3,788,486.
Littmann, David, 3,787,968.
Schroeder, Herbert H., 3,788,906.
Minnesota Mining and Manufacturing Company, mesne: *See—*
Farlow, Jan M., 3,789,426.
Minolta Camera Co., Ltd.: *See—*
Loseries, Peter; and Hayashi, Toshio, 3,788,204.
Minsk, Louis M.: *See—*
Cohen, Hyman L.; King, James R., Jr.; and Minsk, Louis M., 3,788,855.
Mischke, Fritz: *See—*
Markewitz, Wolfgang; and Mischke, Fritz, 3,788,494.
Misenti, Angelo J.; and Notari, Gennaro V., to Combustion Engineering, Inc. Automatic control rod latching device. 3,788,943, Cl. 176-35.000.
Mistopoulos, Chris, Jr., to Ford Motor Company. Window regulator mechanism. 3,788,005, Cl. 49-103.000.
Mitchell, David Lawrence: *See—*
Creighton, Stephen Mark; Mitchell, David Lawrence; and Kay, William Chee, 3,788,003.
Mitchell, William C. Powered impact tool. 3,788,403, Cl. 173-115.000.
Mitsubishi Chemical Industries, Ltd.: *See—*
Hattori, Saburo; and Imaki, Naoshi, 3,789,066.
Mitsubishi Denki Kabushiki Kaisha: *See—*
Matsumoto, Tsuyoshi, 3,788,150.
Mitsubishi Gas Chemical Company, Inc.: *See—*
Matsumura, Shiro; Shin, Hiroshi; Sugano, Junichiro; Yoshii, Tadashi; Kuriyama, Yasuhisa; and Komaki, Takeshi, 3,789,115.
Mitsubishi Jukogyo Kabushiki Kaisha: *See—*
Ujiie, Akira, 3,788,384.
Mitsubishi Petrochemical Company, Limited: *See—*
Yamada, Masatora, 3,788,567.
Mitsubishiki Jukogyo Kabushiki Kaisha: *See—*
Ujiie, Akira; Shimoyama, Hiroshi; and Ueda, Nanji, 3,788,558.
Mittman, Jerome J., to Ford Motor Company. Method of assembling a gas turbine regenerator assembly. 3,787,944, Cl. 29-157.30r.
Miya, Masami, to Nepon Kabushiki Kaisha (Nepon Company, Ltd.). Nestable boat on a knock down plan. 3,787,911, Cl. 9-2.00s.
Miyashita, Yoshio: *See—*
Mimino, Tohru; Nara, Shuuroku; Miyashita, Yoshio; and Nishikawa, Katsuhiko, 3,788,843.
Miyazaki, Toru. Two-four channel changeover circuit for a cartridge-type tape player. 3,789,162, Cl. 179-100.2ca.
Mizuba, Seth Setsuo: *See—*
Hsu, Charles F.; Jiu, James; and Mizuba, Seth Setsuo, 3,788,947.
Mizuki, Eiichi: *See—*
Taguchi, Seiichi; and Mizuki, Eiichi, 3,788,849.
Mizumoto, Yoshio, to Alps Motorola, Inc. Amplifier circuitry for two-four channel cartridge type tape player. 3,789,161, Cl. 179-100.20z.
Mobil Oil Corporation: *See—*
Anderson, James J.; Camacho, Vasco G.; and Kinney, Robert E., 3,789,091.
Andress, Harry J., Jr., 3,788,993.
Messenger, Joseph U., 3,788,406.
Patton, Bobbie J., 3,789,355.
Shephard, Cecil A. Y., 3,788,398.
Zahner, John C., 3,788,038.
Modine Manufacturing Company: *See—*
Miller, Robert F., 3,789,284.
Modrak, Thomas M.; and Curtis, Robert W., to Babcock & Wilcox Company, The. Vapor-liquid separator. 3,788,282, Cl. 122-34.000.
Moen, Alfred M. Faucet construction. 3,788,356, Cl. 137-625.170.
Moertel, George B.; and Johnston, James R., to Textron, Inc. Gapped and cleaned seam-type slide fastener chains and method and apparatus for making the same. 3,787,952, Cl. 29-408.000.
Mohon, Windell N.: *See—*
Breglia, Denis R.; Mohon, Windell N.; and Mulson, Joseph F., 3,788,733.
Mohrbacker, William J.: *See—*
Buelow, William H.; Mohrbacker, William J.; and Mihulowicz, George, 3,788,610.
Molina, Orlando G., to North American Rockwell Corporation. Dye penetrant composition and method utilizing same. 3,789,221, Cl. 250-302.000.
Moline, Roy Virgil, to Jeno's, Inc. Pizza processing machine. 3,788,030, Cl. 53-123.000.
Moll Apparatebau GmbH: *See—*
Moll, Philipp; and Goebbels, Wolfgang, 3,788,247.
Moll, Philipp; and Goebbels, Wolfgang, to Moll Apparatebau GmbH. Machine for the stitching of buttonholes on garments. 3,788,247, Cl. 112-121.120.
Momchilov, Emil Nikolov: *See—*
Balevsky, Anguel Tonchev; Nikolov, Ivan Dimov; Nenov, Dragan Iliev; and Momchilov, Emil Nikolov, 3,788,790.
Momoi, Toshimitu: *See—*
Ono, Minoru; and Momoi, Toshimitu, 3,788,913.
Monitor Labs, Inc.: *See—*
Budd, Allan L.; Foster, Robert E.; and Greenberg, Jonathan S., 3,788,545.
Monon Trailer Inc.: *See—*
Ehrlich, Donald J., 3,788,682.
Monostruct Corporation Limited: *See—*
Hutchison, David John, 3,789,094.
Monroe, Darrell W.: *See—*
Pelmulder, John P.; Meister, Cornelius; and Monroe, Darrell W., 3,788,470.
Monsanto Company: *See—*
Dobo, Emerick J., 3,788,786.
Giacoma, Frederick Alfred, Jr.; Godbold, Channing W.; and Stephens, Richard Wilson, 3,788,514.
Maier, Ludwig, 3,789,092.
Perry, Eli; and Strazik, William F., 3,789,079.
Perry, Eli; and Strazik, William F., 3,789,080.
Sullivan, James D., 3,788,992.
Montecatini Edison S.p.A.: *See—*
Longi, Paolo; Cameli, Nazzareno; Valvassori, Alberto; Parodi, Sandro; and Cervi, Remo, 3,789,036.
Moody, Larry Dean: *See—*
Garrett, Carl Eugene; Kinsley, William Henry, Jr.; and Moody, Larry Dean, 3,789,099.
Mooney, Leonard J.: *See—*
Krawetz, Barton; Long, Jack B.; and Mooney, Leonard J., 3,789,321.
Moore, Cecil L. Control assembly for jet boat. 3,788,265, Cl. 115-12.00r.
Moore, Robert E., to Sun Research and Development Co. Haloadamantanes. 3,789,089, Cl. 260-648.00r.
Moore, Thomas J.; and Holko, Kenneth H., to United States of America, National Aeronautics and Space Administration. Diffusion welding in air. 3,787,959, Cl. 29-482.000.
Mora, Maria. Packet nasal inhaler. 3,788,316, Cl. 128-200.000.
Morelock, Charles R., to General Electric Company. Coated filaments. 3,788,893, Cl. 117-216.000.
Morgan, Robert E., to General Motors Corporation. Rotary engine oil metering pump. 3,788,782, Cl. 418-84.000.
Morini, Emilio, to Societa Applicazioni Gomma Antivibranti "Saga" S.p.A. Shock absorber for use as a fender for ships. 3,788,260, Cl. 114-219.000.
Morishita, Yasumatsu: *See—*
Yamazaki, Tatsuya; and Morishita, Yasumatsu, 3,788,570.
Moritz, Rolf: *See—*
Folkens, Dieter; and Moritz, Rolf, 3,788,214.
Morphis, Charles W.; and Hilburn, Bennie D., to Mead Corporation, The. Tools for joining of disconnecting pipes. 3,787,951, Cl. 29-237.000.
Morrell, Albert Maxwell, to RCA Corporation. Methods of manufacture of color picture tubes. 3,788,848, Cl. 96-36.100.
Morrell, Ronald Joseph: *See—*
Lenaeris, George Victor; Laing, Graham Sterling; Morrell, Ronald Joseph; and Willis, Wesley Nelson, 3,789,348.
Morris, William F., Jr. Cube ice separator and screening apparatus. 3,788,566, Cl. 241-73.000.
Morrison, Howard J.; and Nix, Donald Frederick, to Glass, Marvin, & Associates. Missile actuated target lever. 3,788,643, Cl. 273-102.10g.
Morrison, Larry A.: *See—*
Bornett, Charles B.; and Morrison, Larry A., 3,788,577.
Morse, Donald B.; and Pribish, Bernard A., to Kemlite Corporation. Machine for trimming the edges of panels. 3,788,174, Cl. 83-79.000.
Morse, George E.: *See—*
Miller, Arthur W.; Stuemky, Robert E.; and Morse, George E., 3,788,098.
Moses, Donald J., to National Cash Register Company, The. Address code terminal. 3,789,364, Cl. 340-166.00r.
Motor Coach Industries, Inc.: *See—*
Derragon, Don C., Jr., 3,788,394.
Motorola, Inc.: *See—*
Ivas, Thomas W.; and Slavik, William H., 3,789,134.
Ritchie, Kim, 3,789,023.
Mott, James D., to Hydril Company. Hi-lo valve. 3,788,594, Cl. 251-58.000.
Mrozek, John W.: *See—*

Dieckman, Robert W.; Albers, Bernd G.; and Mrozek, John W., 3,788,237.

Mueller, James R.: *See—*
Barton, James C.; Christensen, Jon C.; and Mueller, James R., 3,788,697.

Mueller, Von W.: *See—*
Jameel, Khaja M.; and Mueller, Von W., 3,789,332.

Muller, Jurgen; and Lohrberg, Karl, to Metallgesellschaft Aktiengesellschaft. Layered electrode. 3,788,968, Cl. 204-290.00r.

Muller, Richard, to Gebr. Hofman K.G., Maschinenfabrik. Device for the balancing of out of balance bodies especially vehicle wheels. 3,788,147, Cl. 73-459.000.

Muller, Rudolf: *See—*
Greiner, Joachim; Engelsmann, Dieter; Gersch, Josef; Landbrecht, Franz; Muller, Rudolf; Wenger, Wolfgang; and Wiedemann, Otto, 3,789,157.

Mullio, Norbert V., to Whittaker Corporation, mesne. Pearlescent pigment. 3,788,871, Cl. 106-291.000.

Mulson, Joseph F.: *See—*
Breglia, Denis R.; Mohon, Windell N.; and Mulson, Joseph F., 3,788,733.

Mulvey, Gerard Edmund. Modular ceiling construction. 3,788,206, Cl. 98-40.0dl.

Munk, Benedikt Aa., to Ohio State Univeristy Research Foundation, The. Periodic surface for large scan angles. 3,789,404, Cl. 343-18.00b.

Munz, Paul, to Maschinenfabrik & Gresserei Netstal A.G. Closure nozzle with a movable cover for an injection molding machine. 3,788,791, Cl. 425-245.000.

Murayama, Tohru: *See—*
Sawano, Takahiro; Kabota, Katuhiko; Ando, Masaru; Wada, Moriyasu; Murayama, Tohru; and Ozawa, Tadayuki, 3,789,275.

Murphree, Francis J., to United States of America, Navy. Multipath sonar simulator. 3,789,128, Cl. 35-10.400.

Murphy, Charles P.: *See—*
Sarkisian, Arthur; and Murphy, Charles P., 3,788,081.

Murphy, James L., Jr.; Grace, Garland K.; and Rogers, Rudy E., to Thiokol Chemical Corporation. Spray-freezing apparatus and method. 3,788,095, Cl. 62-347.000.

Murray, Michael V.: *See—*
Helwig, Lawrence E.; and Murray, Michael V., 3,788,877.

Muscatell, Francis L.; Ramachandran, Sundaresan; and Reen, Orville W., to Allegheny Ludlum Industries, Inc. Method of making low nitrogen alloys. 3,788,836, Cl. 75-49.000.

Musser, John J., to Reintjes, Geo. P., Co., Inc. Designing and building furnace structures with single size brick. 3,788,015, Cl. 52-80.000.

M.V. Engineering & Mfg., Inc.: *See—*
Skinner, James R., 3,788,464.

Myers, John W., to Phillips Petroleum Company. Reforming catalyst. 3,789,024, Cl. 252-466.0pt.

N L Industries, Inc.: *See—*
Rutt, Truman C., 3,788,867.
Simone, Dominic; and Herman, Daniel F., 3,789,039.

Nadella: *See—*
Pitner, Alfred, 3,788,100.

Nadherny, Rudolph E., to Illinois Railway Equipment Company. Box car having belt rail supports mounted on lading tie anchors. 3,788,240, Cl. 105-369.00b.

Nagamine, Katsuhiko: *See—*
Ogata, Fumimaro; and Nagamine, Katsuhiko, 3,788,940.

Nagasawa, Takeshi; Kuroiwa, Katsumasa; and Narita, Kouichi, to Nitto Boseki Co., Ltd. Glass fiber-reinforced epoxy resin or polyester resin composition and method for manufacturing same. 3,789,049, Cl. 260-40.00r.

Nagee, John S., Jr.: *See—*
Dolbear, Geoffrey E.; and Nagee, John S., Jr., 3,788,977.

Naismith, Thomas D.: *See—*
Brooks, Frank W.; and Naismith, Thomas D., 3,788,429.

Nakajima, Tohru; and Niiho, Masaaki, to Asahi Kogaku Kogyo Kabushiki Kaisha. Method and electronic machine for teaching arithmetic computation. 3,787,988, Cl. 35-31.00r.

Nakamura, Yoshuharu: *See—*
Nakazawa, Yoshiyuki; Nakamura, Yoshuharu; Sueyoshi, Tohru; and Sato, Akira, 3,788,859.

Nakayama, Eiji. Box wrench. 3,788,169, Cl. 81-177.0uj.

Nakazawa, Seinosuke, to Ikegai Tekko Kabushiki Kaisha. Apparatus for heat sealing the overlapping end portions of an elongated thermoplastic strapping band. 3,788,933, Cl. 156-513.000.

Nakazawa, Yoshiyuki; Nakamura, Yoshuharu; Sueyoshi, Tohru; and Sato, Akira, to Fuji Photo Film Co., Ltd. Fine grain silver halide photographic emulsion containing hemicyanine sensitizing dye. 3,788,859, Cl. 96-139.000.

Nalco Chemical Company: *See—*
Seale, Virgil L.; Svarz, Jerry J.; Goretta, Louis A.; Newkirk, John D.; Hunter, Wood E.; and Sibert, Frederick J., 3,789,074.

Nam, Joon Woo; and Choi, Ung So, to Korea Institute of Science and Technology. Compressed air scutcher. 3,787,929, Cl. 19-85.000.

Nara, Shuuroku: *See—*
Mimino, Tohru; Nara, Shuuroku; Miyashita, Yoshio; and Nishikawa, Katsuhiko, 3,788,843.

Narabu, Jiro, to Seibu Gomu Kagaku Kabushiki Kaisha. Assembled fender unit. 3,788,082, Cl. 61-48.000.

Naradi, narodni podnik: *See—*
Koudelka, Vladimir; and Lada, Mirko, 3,788,404.

Narayanan, Venkatachala L.; and Bernstein, Jack, to Squibb, E. R., & Sons, Inc. Adamantylalkylaminoalkyl benzamides. 3,789,073, Cl. 260-558.00a.

Narda Microwave Corporation, The: *See—*
Aslan, Edward E., 3,789,299.

Narita, Kouichi: *See—*
Nagasawa, Takeshi; Kuroiwa, Katsumasa; and Narita, Kouichi, 3,789,049.

Narres, Hans-Dieter: *See—*
Nolte, Gerhard; Rabowsky, Hans; Krause, Johannes; and Narres, Hans-Dieter, 3,788,842.

Nashizawa, Junichi, to Zaiden Hojin Handotai Kenkyu Shinkokai. Signal converter wherein photoemission time constant is utilized. 3,789,317, Cl. 331-94.50c.

Nassenstein, Heinrich; and Fitzky, Hans-Georg, to Bayer Aktiengesellschaft. Increase in the transmitting information capabilities of wave image-forming systems. 3,788,728, Cl. 350-96.0wg.

National Can Corporation: *See—*
Balentino, Frank, Jr., 3,788,457.

National Cash Register Company, The: *See—*
Bremner, David F., 3,789,193.
Janning, John L., 3,789,264.
Moses, Donald J., 3,789,364.
Sarageno, Ignatius B.; and Wegmiller, Gary R., 3,788,334.

National Electrostatics Corporation: *See—*
Herb, Raymond G., 3,789,298.

Nebgen, William H., to Brayton Cycle Improvement Associates, mesne. . 3,788,066, Cl. Refrigerated intake bryton cy.

Neeff, Rutger: *See—*
Kalz, Dietmar; Wolfrum, Gerhard; and Neeff, Rutger, 3,788,810.

Neel, Jean: *See—*
Bernard, Andre; Gagne, Pierre; Gras, Georges; and Neel, Jean, 3,788,884.

Neel, Robert M.; Lloyd, Clarence Robert; and Johnson, Robert C., to Reynolds, R. J., Tobacco Company. Solvent recovery in tobacco treating process. 3,788,331, Cl. 131-143.000.

Negishi, Kazuo, to Victor Company of Japan, Limited. System for recording and reproducing digital signals. 3,789,139, Cl. 178-6.60a.

Neidorf, Samuel W.; and Arnold, Howard K., to Bar-O-Matic Sales Co. Liquid dispensing apparatus. 3,788,343, Cl. 137-209.000.

Nelson, George L.: *See—*
Hirsch, Ernest G.; and Nelson, George L., 3,788,469.

Nelson, Leonard, to Custom Tool & Machine Co., Inc. Machine tool vise. 3,788,635, Cl. 267-244.000.

Nelson, Robert T.: *See—*
Goff, James R., 3,788,010.

Nelson, Scott N. Mathematical cube puzzle. 3,788,645, Cl. 273-156.000.

Nelson, Terrence John: *See—*
Chen, Yu-Ssu; Geusic, Joseph Edward; and Nelson, Terrence John, 3,789,375.

Nenov, Dragan Iliev: *See—*
Balevsky, Anguel Tonchev; Nikolov, Ivan Dimov; Nenov, Dragan Iliev; and Momchilov, Emil Nikolov, 3,788,790.

Nepon Kabushiki Kaisha (Nepon Company, Ltd.): *See—*
Miya, Masami, 3,787,911.

Nesbitt, John D.; and Fejer, Mark E., to Institute of Gas Technology. Process for pre-treating and melting glassmaking materials. 3,788,832, Cl. 65-134.000.

Neste Oy: *See—*
Huttunen, Jouko, 3,788,929.

Netter, Felix P. Small vehicle lift. 3,788,414, Cl. 180-8.710.

Netterstedt, Sture; and Lindstrand, Bengt, to Rostfria Tak AB. Method of spirally winding strip metal about a pipe, and securing adjacent strips by welding. 3,789,181, Cl. 219-62.000.

Neumann, Friedmund: *See—*
Wiechert, Rudolf; and Neumann, Friedmund, 3,789,087.

New England Clock Company: *See—*
Tornquist, Nils M.; Kneeland, Howard; and Sessions, William K., Jr., 3,788,061.

New England Power Company: *See—*
Hirsch, Ernest G.; and Nelson, George L., 3,788,469.

Newell, George F., to Westinghouse Electric Corporation. Time compression of audio signals. 3,789,137, Cl. 178-6.600.

Newkirk, John D.: *See—*
Seale, Virgil L.; Svarz, Jerry J.; Goretta, Louis A.; Newkirk, John D.; Hunter, Wood E.; and Sibert, Frederick J., 3,789,074.

Newton, Jack W.: *See—*
Rostler, Fritz S.; White, Richard M.; and Newton, Jack W., 3,788,883.

Nguyen, Van-Tran: *See—*
Bridges, Thomas James; and Nguyen, Van-Tran, 3,789,235.

Nicholls, James Andrew: *See—*
Kempson, Bertram Carl; and Nicholls, James Andrew, 3,788,063.

Nichols, John Joseph: *See—*
Carlisle, Denis Richard; and Nichols, John Joseph, 3,788,067.

Nicholson, Gordon B., III: *See—*
Athy, Lawrence F., Jr.; Rushing, Sandy S., Jr.; and Nicholson, Gordon B., III, 3,788,341.

Nickl, Josef: *See—*
Kruger, Gerd; Zipp, Otmar; Keck, Johannes; Nickl, Josef; Machleidt, Hans; Ohnacker, Gerhard; Engelhorn, Robert; and Puschmann, Sigfrid, 3,789,125.

Nickla, Louis E.: *See—*

Fachini, Robert M.; Kenna, Fenton L., Jr.; Barrett, Monroe C.; Nickla, Louis E.; and Graham, Robert L., 3,788,495.
Nickles, Lawrence H., to General Motors Corporation. Variable vanes. 3,788,763, Cl. 415-147.000.
Nieboer, Pieter, to Demag Aktiengesellschaft. Charging head for a metallurgical furnace. 3,788,621, Cl. 266-27.000.
Nielsen, Alan H., to United States of America, Air Force. Automatic step eliminator circuit to prevent radar jamming. 3,789,405, Cl. 343-18.00e.
Nielsen, John G.: *See—*
Hefernan, William; Hair, George R.; and Nielsen, John G., 3,788,032.
Niiho, Masaaki: *See—*
Nakajima, Tohru; and Niiho, Masaaki, 3,787,988.
Niitm Pri Ban: *See—*
Balevsky, Anguel Tonchev; Nikolov, Ivan Dimov; Nenov, Dragan Iliev; and Momchilov, Emil Nikolov, 3,788,790.
Nikolov, Ivan Dimov: *See—*
Balevsky, Anguel Tonchev; Nikolov, Ivan Dimov; Nenov, Dragan Iliev; and Momchilov, Emil Nikolov, 3,788,790.
Nilsson, Lennart: *See—*
Folkesson, Bertil; Nilsson, Lennart; and Sjostrand, Uno, 3,788,028.
Ninomiya, Mikio: *See—*
Ito, Shoichi; Ninomiya, Mikio; and Uchida, Hidekuni, 3,789,068.
Nippon Accumulator Kabushiki Kaisha: *See—*
Taki, Hiroaki, 3,788,358.
Nippon Electric Company, Limited: *See—*
Iwakami, Takuya, 3,789,326.
Nippon Kokan Kabushiki Kaisha: *See—*
Mimino, Tohru; Nara, Shuuroku; Miyashita, Yoshio; and Nishikawa, Katsuhiko, 3,788,843.
Nippon Oil Co., Ltd.: *See—*
Otsuki, Yutaka; Hara, Hajime; and Imai, Nobuo, 3,789,090.
Nishiguchi, Shigeo; and Okatani, Masahiko, to Tokusyu Aerosol Company, Ltd. Automatic intermittent spray valve for pressurized packaging. 3,788,550, Cl. 239-337.000.
Nishikawa, Katsuhiko: *See—*
Mimino, Tohru; Nara, Shuuroku; Miyashita, Yoshio; and Nishikawa, Katsuhiko, 3,788,843.
Nishimatsu, Shigeru: *See—*
Yoshida, Isao; Tokuyama, Takashi; Nishimatsu, Shigeru; and Ikeda, Takahide, 3,787,962.
Nishizawa, Junichi, to Handotai Kenkyu Shinkokai. Position control system using magnetic force. 3,789,285, Cl. 318-687.000.
Nissan Motor Company: *See—*
Ishii, Yasushi, 3,789,148.
Nissan Motor Company, Limited: *See—*
Maeda, Riichi, 3,788,596.
Usui, Keizauburo; and Yamaguchi, Michio, 3,788,669.
Nitta, Hifumi; and Kaneko, Mitsutaka, to Chubu Seiki Kabushiki Kaisha. Apparatus for measuring insulating and voltage resistant characteristics of articles. 3,789,294, Cl. 324-54.000.
Nittinger, Russell H.; and Taylor, Donald O., to Allied Chemical Corporation. Plenum chamber. 3,788,423, Cl. 181-33.00k.
Nitto Boseki Co., Ltd.: *See—*
Nagasawa, Takeshi; Kuroiwa, Katsumasa; and Narita, Kouichi, 3,789,049.
Nix, Donald Frederick: *See—*
Morrison, Howard J.; and Nix, Donald Frederick, 3,788,643.
Noble Drilling Corporation: *See—*
Lorenz, Howard I.; and Rosser, Eugene P. (said Rosser assor. to), 3,788,407.
Noble, Jack E.; and Johnston, Richard P., to United States of America, Health, Education and Welfare. Energy converter to power circulatory support systems. 3,788,772, Cl. 417-207.000.
Nolan, George J.; and Hogan, Robert J., to Phillips Petroleum Company. Dehydrogenation. 3,789,078, Cl. 260-680.00e.
Noll, James L.; and Zens, John F., to General Motors Corporation. Occupant restraint system. 3,788,665, Cl. 280-150.0ab.
Nolte, Gerhard; Rabowsky, Hans; Krause, Johannes; and Narres, Hans-Dieter, to Knapsack Aktiengesellschaft. Process for recovering mercury. 3,788,842, Cl. 75-109.000.
Noone, Thomas M., to Richardson Company, The. Synthetic composite and process for preparing. 3,788,882, Cl. 117-76.00t.
Norcross, Sterling E. Lock for wheeled vehicle. 3,788,108, Cl. 70-233.000.
Nordson Corporation: *See—*
Vilagi, Burton J.; and Stumphauzer, William C., 3,788,561.
Noreen, Dennis L. Combination athletic garment. 3,788,314, Cl. 128-159.000.
Norris, Kermit A., to Lockheed Electronics Company, Inc. Pseudo-random sequence synchronization for magnetic recording system. 3,789,377, Cl. 340-174.10g.
North American Rockwell Corporation: *See—*
Cooper, George P., 3,789,261.
Mee, Jack E.; and Besser, Paul J., 3,788,896.
Molina, Orlando G., 3,789,221.
Northern Electric Company Limited: *See—*
Lenaeris, George Victor; Laing, Graham Sterling; Morrell, Ronald Joseph; and Willis, Wesley Nelson (said Lenaerts, Morrell and said Willis assors. to), 3,789,348.
Nosco Plastics, Incorporated: *See—*
Cloyd, Harold S., 3,788,599.
Notari, Gennaro V.: *See—*
Misenti, Angelo J.; and Notari, Gennaro V., 3,788,943.
Novkov, Raymond E., to Warner & Swasey Company, The. Locking pin mechanism for securing tool bits to tool holders. 3,787,941, Cl. 29-96.000.
Nussbaum, Ralph W.: *See—*
Curtis, Omer E., Jr.; Tuller, Harold W.; and Nussbaum, Ralph W., 3,789,038.
Nutron Corporation: *See—*
Denker, James M., 3,788,339.
Oak Industries Inc.: *See—*
Harney, Ralph P., 3,789,131.
O'Brien, Terence J., to Callus Memories, Inc. Latch mechanism for memory disc cartridge. 3,789,273, Cl. 317-141.00r.
Obsomer, Marc: *See—*
Dumoulin, Joseph; and Obsomer, Marc, 3,789,083.
Ochsner, Arnold. Apparatus for producing colored patterns in embroidery machines. 3,788,246, Cl. 112-83.000.
O'Connor, Chadwell. Steam engine. 3,788,193, Cl. 91-243.000.
Oden, Earl Clarence. Method of crystallizing using magnetic materials. 3,788,819, Cl. 23-300.000.
Odera, Eiichi: *See—*
Saito, Yoshihiro; Okada, Tomoo; Odera, Eiichi; and Matsuzawa, Teruyuki, 3,789,147.
Odom, George H. Mooring device. 3,788,258, Cl. 114-230.000.
O'Donnell, Thomas P.: *See—*
Austin, Lewis M.; Denman, Robert R.; O'Donnell, Thomas P.; and Veres, Frank, 3,788,828.
Oestreicher, Warren J., to Centralalarm International, Inc. Alarm system with central station monitoring of key operated locks of a number of remote stations. 3,789,382, Cl. 340-213.00r.
Ogata, Fumimaro; and Nagamine, Katsuhiko, to Kanegafuchi Boseki Kabushiki Kaisha and Snia Viscosa Societa Nazionale Industria Applicazioni Viscosa S.p.A. Polyolefin-polyamide composite filaments having an improved adhering property and a method thereof. 3,88,940, Cl. 111-173.000.
Ogle, James: *See—*
Holz, George E.; and Ogle, James, 3,789,265.
Ogle, Robert W., to IMS Limited. Mini dropper. 3,788,528, Cl. 222-209.000.
O'Hara, William J.: *See—*
Donowitz, Howard; and O'Hara, William J., 3,788,327.
Ohashi, Youitu: *See—*
Yamamoto, Masayuki; Kobayashi, Kazuo; and Ohashi, Youitu, 3,788,905.
Ohio State Univeristy Research Foundation, The: *See—*
Munk, Benedikt Aa., 3,789,404.
Ohnacker, Gerhard: *See—*
Kruger, Gerd; Zipp, Otmar; Keck, Johannes; Nickl, Josef; Machleidt, Hans; Ohnacker, Gerhard; Engelhorn, Robert; and Puschmann, Sigfrid, 3,789,125.
Ojima, Kenji, to Aisin Seiki Kabushiki Kaisha. Transfer gear assembly. 3,788,164, Cl. 74-665.00t.
O.K. Tool Company, The: *See—*
Williams, Thurston V.; and Cheever, Leo H., 3,788,009.
Okada, Masaru: *See—*
Dokubo, Tomoji; Hashimoto, Kiyoshi; and Okada, Masaru, 3,788,805.
Okada, Tomoo: *See—*
Saito, Yoshihiro; Okada, Tomoo; Odera, Eiichi; and Matsuzawa, Teruyuki, 3,789,147.
Okamoto, Hidehiro: *See—*
Izawa, Shinichi; Toyama, Kunio; Sugawara, Yoshiaki; Tanaka, Tsutomu; and Okamoto, Hidehiro, 3,789,054.
Okamura, Soji: *See—*
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Okatani, Masahiko: *See—*
Nishiguchi, Shigeo; and Okatani, Masahiko, 3,788,550.
Okuda, Masanao: *See—*
Kobayashi, Sethin; Torii, Michihiro; and Okuda, Masanao, 3,788,924.
Oldfield, Clarence E. Collapsible shoehorn. 3,788,531, Cl. 223-118.000.
Oldfield, Eric, to Westinghouse Canada Limited. Multicable drum hoisting system. 3,789,280, Cl. 318-45.000.
O'Leary, Richard P.; and Kapr, Charles F. Cooling towerwater control system. 3,788,340, Cl. 137-93.000.
Olin Corporation: *See—*
Shapiro, Eugene; Crane, Jacob; and Eichelman, George H., Jr., 3,788,902.
Vancil, Rayburn D., 3,788,667.
Olive, Martin Frederick: *See—*
Cook, Terence John; and Olive, Martin Frederick, 3,789,082.
Olivetti, Ing., C., & C., S.p.A.: *See—*
Bonzano, Giorgio; Lesca, Pier Carlo; and Ponzano, Luigi, 3,789,378.
Dalmasso, Claudio, 3,789,341.
Olympia Werke AG: *See—*
Folkens, Dieter; and Moritz, Rolf, 3,788,214.
Olympus Optical Co., Ltd.: *See—*
Takahashi, Nagashige, 3,788,304.
O'Neill, John Francis: *See—*
Medill, David Gordon; and O'Neill, John Francis, 3,789,152.
Onishi, Roy K.: *See—*

Dalena, Rudolph; Onishi, Roy K.; and Walker, Donald F., 3,789,403.

Ono, Minoru; and Momoi, Toshimitu, to Hitachi, Ltd. Silicon nitride on silicon oxide coatings for semiconductor devices. 3,788,913, Cl. 156-11.000.

Onoyama, Atsushi: *See—*
Idei, Gijun; Onoyama, Atsushi; Aihara, Mitsuo; Suzuki, Seigo; Egawa, Hideharu; and Yamaga, Eiichi, 3,788,058.

Onufry, Michael, Jr.: *See—*
Campanella, Samuel Joseph; Suyderhoud, Henri George; and Onufry, Michael, Jr., 3,789,165.

Orizio, Paolo. Pattern disc for tubular multiple-drop knitting machines. 3,788,101, Cl. 66-60.00a.

Ormiston, Robert A.: *See—*
Sweeney, Thomas E.; Condit, Philip M.; and Ormiston, Robert A., 3,788,578.

Ormond, Alfred Newman. Low interaction multi load cell system for measuring thrust. 3,788,130, Cl. 73-117.400.

Ornstein, Jacob L., to Texas Instruments, Incorporated. Composite thermostat material. 3,788,821, Cl. 29-195.500.

Orosy, David J.; and Matlen, Abraham J., to Matlen, Abraham J. Temperature regulation for electrical heater. 3,789,190, Cl. 219-497.000.

Orthuber, Richard Kaspar, to International Telephone and Telegraph Corporation. Image intensifier and method of making an electron multiplier therefor. 3,788,831, Cl. 65-111.000.

Osaka, Kazuhiro Sugae, to Showa Sargent Ltd. Pin-tumbler lock cylinder. 3,788,110, Cl. 70-358.000.

Osawa, Sadao; Tamai, Yasuo; and Takimoto, Masaaki, to Fuji Photo Film Co., Ltd. Process for forming dye images. 3,788,845, Cl. 961-1.00r.

Osborne, Brian G.: *See—*
Ayton, Ian F.; Hartling, Donald C.; Kossoff, Joseph; and Osborne, Brian G., 3,787,999.

OSF Industries, Limited: *See—*
Sobel, Sydney Murray, 3,788,378.

Oshima, Shintaro; Kobayashi, Toshihiko; and Kamibayashi, Tetsusaburo, to Kokusai Denshin Denwa Kabushiki Kaisha. Matrix memory device of high bit density. 3,789,376, Cl. 340-174.0ma.

Osmundsen, Norman K., to Westinghouse Electric Corporation. Shielded spark gap device. 3,789,256, Cl. 313-313.000.

Ostrowsky, Daniel B.; and Spitz, Erich, to Thomson-CSF. Stimulated emission radiation source with adjustable wavelength. 3,789,318, Cl. 331-94.50c.

Ostrowsky, Efrem M., to Federal Tool & Plastics; a division of VCA Corporation. Plastic dispensing nozzle with pouring spout with removable seal. 3,788,549, Cl. 239-309.000.

Othmer, Donald F. Sewage treatment system. 3,788,476, Cl. 210-194.000.

Otsuki, Yutaka; Hara, Hajime; and Imai, Nobuo, to Nippon Oil Co., Ltd. Process for the production of conjugated diene liquid polymers. 3,789,090, Cl. 260-669.00p.

Ouere, Emile: *See—*
Ane, Jean-Pierre; Teillard, Jean-Paul; and Ouere, Emile, 3,788,352.

Oulevay, Serge; and Thevenaz, Jean, to Bolex International SA. Procedure and device for synchronising cinematographic cameras with a projector. 3,788,736, Cl. 352-180.000.

Outboard Marine Corporation: *See—*
Strang, Charles D., 3,788,266.

Owatonna Tool Company: *See—*
McClocklin, Samuel B., 3,788,781.

Owens-Corning Fiberglas Corporation: *See—*
Klink, Jerome P.; Lyle, Phra D.; and Griffith, Terry L., 3,788,826.

Owens-Illinois, Inc.: *See—*
Austin, Lewis M.; Denman, Robert R.; O'Donnell, Thomas P.; and Veres, Frank, 3,788,828.
Meincer, John H., 3,788,462.
Miner, Robert J.; and Meek, Harry M., 3,788,829.
Reither, Thomas D.; and Trease, Ralph E., 3,788,321.

Oxley, Arthur R., to Franklin Electric Subsidiaries, Inc. Strainweigh balance. 3,788,411, Cl. 177-211.000.

Ozawa, Tadayuki: *See—*
Sawano, Tukahiro; Kabota, Katuhiko; Ando, Masaru; Wada, Moriyasu; Murayama, Tohru; and Ozawa, Tadayuki, 3,789,275.

Pachaly, Robert W., to Gulf Research & Development Company. Process for obtaining deuterium from hydrogen-containing components and the production of heavy water therefrom. 3,789,112, Cl. 423-580.000.

Pacific Technology, Inc.: *See—*
Carpenter, Edward J.; and Leyde, Warren L., 3,789,201.

Paclian, Owen; Rister, Donald R.; and Kellar, Richard L., to Toroid Corporation. Force sensing transducer. 3,788,133, Cl. 73-1/1.00a.

Paillard S.A.: *See—*
Menzi, Ulrich, 3,788,443.

Painelli, Daniele, to Colgate-Palmolive Company. Detergent containing enzyme and coarse perborate particles. 3,789,001, Cl. 252-99.000.

Pako Corporation: *See—*
Lee, Conrad E., 3,788,153.

Palac, Kazimir, to Zenith Radio Corporation. Method of processing a color cathode-ray tube. 3,787,937, Cl. 25-25.130.

Palm, Robert J.: *See—*
Brainard, James L.; and Palm, Robert J., 3,788,705.

Palmer, Beverly F.: *See—*
Hoadley, Harvey O.; Wolfe, Robert N.; Palmer, Beverly F.; and Van Heyningen, Roger S., 3,788,171.

Palsson, Jan-Frederik: *See—*
Martensson, Kjell Halvard; Linde, Bjorn H:Son; Palsson, Jan-Frederik; and Jerre, Sven Torsten, 3,788,033.

Panel Technology Inc., mesne: *See—*
Milgram, Alvin A., 3,788,722.

Pantel, Wolfgang, to Kernan, Hans. Machine for cutting rigid foam blocks. 3,788,178, Cl. 83-171.000.

Pappers, Rudolf; Hohberg, Georg; and John, Kurt, to Knauer GHBH & Co., KG Maschinenfabrik. Apparatus for manufacturing concrete pipes, particularly shaft rings. 3,788,793, Cl. 425-432.000.

Park, Jack H., to Texaco Inc. Method and apparatuses for transmission of data from the bottom of a drill string during drilling of a well. 3,788,136, Cl. 73-151.000.

Park-Ohio Industries Inc.: *See—*
Cachat, John F., 3,789,180.

Parke, Davis, & Company: *See—*
Fusari, Salvatore A.; and Loeck, Leslie M., 3,789,119.

Parker, Herbert William Mansfield, to Pyrotenax Limited. Tamper proof electrical cables. 3,789,130, Cl. 174-113.000.

Parker-Hannifin Corporation: *See—*
Bragg, Kenneth R., 3,788,039.
Bragg, Kenneth R.; and Kenyon, Richard L., 3,788,040.
Johnson, Kenneth R., 3,788,348.
Lansky, Zdenek J.; and Claar, Leslie M., 3,788,076.

Parlier, Roger Ernest. Keylock. 3,788,111, Cl. 70-364.00r.

Parodi, Sandro: *See—*
Longi, Paolo; Cameli, Nazzareno; Valvassori, Alberto; Parodi, Sandro; and Cervi, Remo, 3,789,036.

Partos, Stephen E., to Avco Corporation. Self-lubricated pump with means for lubricant purification. 3,788,762, Cl. 415-74.000.

Pasek, James E.; Shea, James M.; and Tobin, Michael F., to General Motors Corporation. Method of fabricating an expanded tube connection. 3,787,945, Cl. 29-157.400.

Pasicka, John F.; and Sorli, Duncan C., to Polaroid Corporation. Photographic apparatus and system for processing large format, self-developing film unit. 3,788,205, Cl. 95-93.000.

Patil, Arvind S.; and Singer, John Jacob, Jr., to Grace, W. R., & Co. Recycling of ion exchange regenerant chemicals. 3,788,960, Cl. 204-180.00p.

Patin, Pierre. Method and apparatus for use in tunnelling. 3,788,087, Cl. 61-84.000.

Patrie, Jos; Lefebvre, Jacques; Segond, Roger; and Badia, Michel, to Cegedur Societe de Transformation de l'Aluminum Pechiney. Electrolytic coloring of anodized aluminum. 3,788,956, Cl. 204-35.00n.

Patton, Bobbie J., to Mobil Oil Corporation. Method of and apparatus for logging while drilling. 3,789,355, Cl. 340-18.01d.

Paulange, Serge. Welding current generator having two interconnected sources. 3,789,230, Cl. 307-1.000.

Paynter, John D.: *See—*
Lewis, William E.; and Paynter, John D., 3,788,835.

Peabody Engineering Corporation: *See—*
Arnold, Orlan M.; and Vancini, Carlo A., 3,788,045.

Pearlman, Samuel: *See—*
Mayaud, Edith Ellen; and Pearlman, Samuel, 3,788,846.

Pearson, William R.: *See—*
Rohrbaugh, Donald G.; and Pearson, William R., 3,788,816.

Pebler, Alfred R.: *See—*
Yannopoulos, Lymperios N.; and Pebler, Alfred R., 3,788,725.

Peck, Reese A.; and Wilson, Raymond F., to Texaco Inc. Coke suppressing additive. 3,788,970, Cl. 208-22.000.

Pedain, Josef: *See—*
Hagemann, Hermann; Pedain, Josef; and Zankl, Erich, 3,789,033.

Pedulla, Joseph, Jr.: *See—*
Madjid, Abdul Hamid; Vaala, Allen R.; Anderson, Walter F., Jr.; and Pedulla, Joseph, Jr., 3,788,818.

Peironet, Pierre R.: *See—*
Delphin, Pierre P.; and Peironet, Pierre R., 3,789,335.

Pelam, Inc.: *See—*
McCormick, James B., 3,788,317.

Pelmulder, John P.; Meister, Cornelius; and Monroe, Darrell W., to FMC Corporation. Method of filtering liquids. 3,788,470, Cl. 210-78.000.

Pennington, William; and Pennington, William, III. Frameless water bed. 3,787,907, Cl. 5-348.0wb.

Pennington, William, III: *See—*
Pennington, William; and Pennington, William, III, 3,787,907.

Pennsylvania Engineering Corporation: *See—*
Dieckman, Robert W.; Albers, Bernd G.; and Mrozek, John W., 3,788,237.
Dortenzo, Alexander T., 3,788,619.

Pennwalt Corporation: *See—*
La Lande, William Alfred, Jr.; Hauptschein, Murray; and Hager, Robert Bonner, 3,789,088.

Penny, Robert Elton, to International Business Machines Corporation. Photosensitive document detector with automatic compensation. 3,789,215, Cl. 250-206.000.

Peoples, Richard A., to Bethlehem Steel Corporation. Apparatus for treating a flux coating. 3,788,272, Cl. 118-47.000.

Performance Industries, Inc.: *See—*
Sutton, Lawrence R.; Ranno, Carl P.; and Hewson, Kenneth E., 3,787,971.

Pergande, Wilfried: *See—*

Kaeppler, Gerhard; Ficker, Stefan; and Pergande, Wilfried, 3,788,046.
Perger, Julius M., to General Motors Corporation. Mudflap and rock ejector combination for a rear dump vehicle. 3,788,668, Cl. 280-154.50r.
Perkin-Elmer Corporation, The: *See—*
Slavin, Sabina; and Kahn, Herbert L., 3,788,752.
Perkins, Norman W., to Ford Motor Company. Seat recline mechanism. 3,788,698, Cl. 297-373.000.
Perma Glas-Mesh Corporation: *See—*
Carpenter, Guy H.; and Ross, Ernest E., 3,788,271.
Perry, Eli; and Strazik, William F., to Monsanto Company. Process for the separation of diene from organic mixtures. 3,789,079, Cl. 260-681.50r.
Perry, Eli; and Strazik, William F., to Monsanto Company. Process for the separation of diene from organic mixtures. 3,789,080, Cl. 260-681.50r.
Perry, James C., to General Motors Corporation. Dual fuel system. 3,788,283, Cl. 123-3.000.
Petersen, Raymond N. Camping unit. 3,788,670, Cl. 280-203.000.
Peterson, Francis C., to Hager, C., & Sons Hinge Manufacturing Co. Hinge with torsion bar. 3,787,923, Cl. 16-184.000.
Peterson, Morris W.: *See—*
Krippene, Brett C.; Peterson, Morris W.; and Marshall, David M., 3,788,796.
Petkovsek, Richard J.: *See—*
Finster, Leslie P.; Petkovsek, Richard J.; and Reader, Trevor D., 3,788,571.
Petrek, John P.: *See—*
Cantrell, C. M., 3,788,954.
Petri, Ralph E., to Rock-Ola Manufacturing Corporation. Selector system for automatic phonographs. 3,789,363, Cl. 340-162.000.
Petrocci, Alfonso N.: *See—*
Adams, Phillip; and Petrocci, Alfonso N., 3,788,989.
Pettinga, Robert: *See—*
Schleben, Harold G., Sr.; and Pettinga, Robert, 3,788,189.
Pexton, Harold W.: *See—*
Guntrum, William E.; Pexton, Harold W.; and Shores, Michael P., 3,787,963.
Pfirrmann, Rolf Wilhelm, to Geistlich, Ed, Sohne A.G. fur Chemische Industrie. α-Phenylsuccinimido-halo-sulphonamidobenzenes. 3,789,056, Cl. 260-239.600.
Pfister, Bruno, to Fichtel & Sachs AG. Air-cooled internal combustion engine with speed control. 3,788,289, Cl. 123-103.00b.
Pfister, William J.; and Shirn, George A., to Sprague Electric Company. Solid electrolytic capacitors having hard solder cathode coating. 3,789,274, Cl. 317-230.000.
Pharmacia AB: *See—*
Kagedal, Sven Lennart; and Akerstrom, Stig Hjalmar Johannes, 3,788,948.
Philco-Ford Corporation: *See—*
Vickland, Jack M., 3,789,415.
Phillips Petroleum Company: *See—*
Bresson, Clarence R.; and Cobb, Raymond L., 3,789,069.
Childers, Clifford W.; and Clark, Earl, 3,789,084.
Gardner, Lloyd E., 3,789,016.
Myers, John W., 3,789,024.
Nolan, George J.; and Hogan, Robert J., 3,789,078.
Rostler, Fritz S.; White, Richard M.; and Newton, Jack W., 3,788,883.
Walker, Darrell W., 3,789,017.
Pick, William Albert, to Honeywell Inc. Diaphragm seal arrangement. 3,789,176, Cl. 200-168.00g.
Piekarek, Egbert Diethelm: *See—*
Schneider, Wolfgang; Piekarek, Egbert Diethelm; and Thommes, Stefan, 3,788,580.
Piepers, Gijsbrecht Gerhardus; Vons, Leonard Hendrik; van der Linde, Aart; and Ijbrink, Eduard, to Reactor Centrum Nederland. Air-excluding spot-welding method for making heat-exchange grid. 3,789,184, Cl. 219-117.00r.
Pieroh, Ernst Albrecht: *See—*
Hoyer, Georg-Alexander; and Pieroh, Ernst Albrecht, 3,789,061.
Pillsbury Company, The: *See—*
Durst, Jack R.; and Winters, William C., 3,788,861.
Schacht, Henry Neil, 3,787,926.
Pincemin, Roger: *See—*
LeComte, Bernard; Henry, Jules; and Pincemin, Roger, 3,787,913.
Pioneer Electronic Corporation: *See—*
Kawai, Kiyoshi, 3,788,648.
Pitner, Alfred, to Nadella. Sealing device for a universal joint. 3,788,100, Cl. 64-17.00a.
Place, Bruce S., to Magnetic Seal Corporation. Rotary seal. 3,788,650, Cl. 277-38.000.
Plant, Ernest M., II, to General Motors Corporation. Rack and pinion steering gear. 3,788,159, Cl. 74-422.000.
Plessey Telecommunications Research Company: *See—*
Clark, Adrian Percy, 3,789,149.
Plizak, Bruno T., to United States of America, Navy. Heat exchange system. 3,788,393, Cl. 165-109.000.
Poetsch, Karl Friedrich: *See—*
Potsch, George; and Poetsch, Karl Friedrich, 3,788,180.
Pokorney, Charles F., to Koehring Company. Tumble packing apparatus. 3,788,029, Cl. 53-59.000.
Polaroid Corporation: *See—*
Idelson, Elbert M., 3,789,062.
Pasieka, John F.; and Sorli, Duncan C., 3,788,205.
Polgar, Michael S.: *See—*
Kuecken, John A.; and Polgar, Michael S., 3,789,416.
Polit, Neil A.; Snowdon, Donald R.; and Watson, Donald W., to Xerox Corporation. Apparatus and method for binding a stack of sheets. 3,788,921, Cl. 156-216.000.
Pollet, Robert Joseph: *See—*
De Cat, Arthur Henri; Sels, Francis Jeanne; Pollet, Robert Joseph; and Willems, Jozef Frans, 3,788,850.
Sels, Francis Jeanne; and Pollet, Robert Joseph, 3,788,852.
Van Poucke, Raphael Karel; and Pollet, Robert Joseph, 3,788,857.
Willems, Jozef Frans; Sels, Francis Jeanne; Pollet, Robert Joseph; and De Cat, Arthur Henri, 3,788,851.
Polman, Jan; Van der Werf, Jan Evert; and Drop, Peter Cornelis, to U.S. Philips Corporation. Arrangement provided with a low-pressure vapour discharge lamp. 3,789,266, Cl. 315-194.000.
Polsak, Edwin Mark; and Kalfas, Donald Joseph, to Combustion Engineering, Inc. Combustion chamber including dry and wet collection of particulate matter. 3,788,244, Cl. 110-8.00r.
Polymet Corporation: *See—*
Hunt, James G., 3,788,820.
Ponzano, Luigi: *See—*
Bonzano, Giorgio; Lesca, Pier Carlo; and Ponzano, Luigi, 3,789,378.
Poquette, Gereon E.: *See—*
Bingham, Ronald E.; Cecil, Thomas F.; Galli, Guido; and Poquette, Gereon E., 3,789,278.
Portage Electric Products, Inc.: *See—*
Wehl, Glenn E., 3,789,339.
Portec, Inc.: *See—*
Steltz, Douglas C., 3,788,501.
Post Office, The: *See—*
Fensom, Harry William, 3,789,155.
Post, Roger L.; and Herschler, Michael G., to Gardner-Denver Company. Compressor unloading control. 3,788,776, Cl. 417-295.000.
Postel-Vinay, Francis, to Fives Lille-Cail. Apparatus for recovering bulk material from a pile. 3,788,445, Cl. 198-36.000.
Postel-Vinay, Francis, to Fives Lille-Cail. Apparatus for recovering bulk material from a pile. 3,788,446, Cl. 198-36.000.
Potsch, George; and Poetsch, Karl Friedrich, to Sun Industries Incorporated. Slitter for display packages and similar products. 3,788,180, Cl. 83-449.000.
Poulsen, Peder Ulrik. Method for the continuous production of fiber reinforced plastic pipes of variable wall thickness. 3,788,918, Cl. 156-171.000.
PPG Industries, Inc.: *See—*
Cuevas, Ephraim A., 3,789,059.
Spindler, Robert G., 3,789,191.
Spindler, Robert G., 3,789,192.
Wismer, Marco; and Prucnal, Paul J., 3,789,034.
Prameta Prazisionsmetall- und Kunststofferzeugnisse G. Baumann & Co.: *See—*
Grunert, Hellmuth, 3,788,759.
Prampart, Joseph, to Societe Financiere et Industrielle des Ateliers et Chantiers de Bretagne. Facility for controlling the orientation of variable-pitch screw blades. 3,788,768, Cl. 416-157.000.
Pratt, Arthur James: *See—*
McKeown, Bamon; Metcalfe, John Leonard; and Pratt, Arthur James, 3,789,040.
Preim, Jan Josef: *See—*
Van Paesschen, August Jean; Van Gossum, Lucien Janbaptist; and Preim, Jan Josef, 3,788,856.
Preisig, Joseph Otto; and Presser, Adolph, to RCA Corporation. Insulated dual gate field-effect transistor signal translator having means for reducing its sensitivity to supply voltage variations. 3,789,246, Cl. 307-304.000.
Presentey, Shelley M. Open switch bypass circuit. 3,789,238, Cl. 307-119.000.
Presley, C. Travis; Argabright, Perry; and Smith, Ronald E., to Marathon Oil Company. Gel composition. 3,789,010, Cl. 252-316.000.
Presser, Adolph: *See—*
Preisig, Joseph Otto; and Presser, Adolph, 3,789,246.
Pressler, Robert L.: *See—*
Hechenbleikner, Ingenuin A.; Hussar, John F.; Koeniger, Arthur F.; and Pressler, Robert L., 3,789,064.
Prest, Jeffrey: *See—*
McMillan, Ian; and Prest, Jeffrey, 3,789,004.
McMillan, Ian; and Prest, Jeffrey, 3,789,005.
McMillan, Ian; and Prest, Jeffrey, 3,789,006.
Prevote, Andre: *See—*
Chauvet, Edmond; and Prevote, Andre, 3,788,634.
Pribish, Bernard A.: *See—*
Morse, Donald B.; and Pribish, Bernard A., 3,788,174.
Price, Edward W.; and Mathes, Homer B. Pulsed end-burning T-burner. 3,788,126, Cl. 73-35.000.
Price, Kenneth R.: *See—*
Kawahata, Masayuki; and Price, Kenneth R., 3,788,967.
Priedigkeit, John H.: *See—*
Keenan, Michael G.; Lynch, William M.; and Priedigkeit, John H., 3,789,412.
Priestley, Joseph A.: *See—*

Campbell, Roger G., Sr.; Goff, Richard E., Jr.; and Priestley, Joseph A., 3,788,365.

Printing Plate Supply Company: *See—*
Hynes, James A., 3,788,931.

Pro-Tech, Inc.: *See—*
Irwin, Malcolm F., 3,788,145.

Profiltex S.A.: *See—*
Romero, Alfonso Torrecillas, 3,788,613.

Progil: *See—*
Coquillion, Jean; and Jay, Pierre, 3,788,998.

Progil and Ciments Lafarge: *See—*
Chaurand, Patrice; Magnan, Regis; and Coquery, Jean-Paul, 3,789,111.

Progressive Dynamics, Inc.: *See—*
Weber, Carl; Shroyer, Larry L.; and Baker, James T., 3,789,210.

Prolss, Hans; and Hegeler, Wilhelm, to Blaupunkt-Werke GmbH. Indicating system with luminous elements. 3,789,362, Cl. 340-147.01p.

Propice, Roger; and Da Rocha, Carlos, to Compagnie Industriells des Telecommunications Cit-Alcatel. Coin operated apparatus. 3,788,440, Cl. 194-99.000.

Propst, Howard B.: *See—*
Propst, Robert L.; and Propst, Howard B., 3,788,276.
Propst, Robert L.; and Propst, Howard B., 3,788,278.

Propst, Robert L.; and Propst, Howard B., to Miller, Herman, Research Corporation. Animal marking apparatus and method. 3,788,276, Cl. 119-1.000.

Propst, Robert L.; and Propst, Howard B., to Miller, Herman, Research Corporation. Animal marking apparatus and method. 3,788,278, Cl. 119-51.00r.

Provanzano, Salvatore R., to Spacetac Incorporated. FET analog multiplex switch. 3,789,244, Cl. 307-251.000.

Pruckmayr, Gerfried, to Du Pont de Nemours, E. I., and Company. Ethylene copolymer dispersions for flame retardation and fibrous articles coated therewith. 3,789,047, Cl. 260-28.50r.

Prucnal, Paul J.: *See—*
Wismer, Marco; and Prucnal, Paul J., 3,789,034.

Prulter, Clarence M., to Cutlas Gear & Mfg, Inc. Automatic hub for four wheel drive vehicles and the like. 3,788,435, Cl. 192-35.000.

Prymelski, Franz: *See—*
Verth, Joachim Zur; and Prymelski, Franz, 3,788,870.

Pullman Incorporated: *See—*
Bailey, John D., 3,788,007.
Bailey, John D., 3,788,239.

Pullman Transport Leasing Company: *See—*
Adler, Franklin P., 3,788,530.

Purman, Joseph W., to Allis, Louis, Company, The. Apparatus for cooling a hermetic motor. 3,789,249, Cl. 310-54.000.

Puschmann, Sigfrid: *See—*
Kruger, Gerd; Zipp, Otmar; Keck, Johannes; Nickl, Josef; Machleidt, Hans; Ohnacker, Gerhard; Engelhorn, Robert; and Puschmann, Sigfrid, 3,789,125.

Putnam, Milton T.; and Cooper, Duane H., to United Recording Electronics Industries. Acoustical delay line. 3,789,328, Cl. 333-30.000.

Pyler, Richard E.: *See—*
Teng, James; Lucas, James M.; and Pyler, Richard E., 3,788,984.

Pyroil Company, Inc.: *See—*
Feldmann, Robert G., 3,787,921.

Pyrotector Incorporated: *See—*
Tufts, Howard L., 3,788,400.
Vasel, Alfred W., 3,789,383.

Pyrotenax Limited: *See—*
Parker, Herbert William Mansfield, 3,789,130.

Q-dot Corporation: *See—*
Barkmann, Herman G., 3,788,388.

Qonaar Corporation: *See—*
Lugowski, Ronald J.; and Sciacero, Rinaldo, 3,788,439.

Quigley, Robert E.: *See—*
Raymond, David W.; Lewis, Robert E.; and Quigley, Robert E., 3,788,608.

Quinn, Peter H. Ice hockey garment. 3,787,892, Cl. 2-2.000.

Quintana, Elias D.: *See—*
Milette, Kenneth A.; Uyeda, Tom M.; and Quintana, Elias D., 3,788,342.

Rabelow, Harold H., to Marsh Stencil Machine Company. Reinforced stencil assembly with foldable, adhesive covering guardian strip. 3,788,217, Cl. 101-128.100.

Rabenhorst, David W.; Brandt, Alan; Darnell, Kenneth E.; and George, James F., to Johns Hopkins University, The. Pseudo-isotropic filament disk structures. 3,788,162, Cl. 74-572.000.

Rabowsky, Hans: *See—*
Nolte, Gerhard; Rabowsky, Hans; Krause, Johannes; and Narres, Hans-Dieter, 3,788,842.

Racz, George: *See—*
Knight, Lindsay Charles; Finch, Colin Maxwell; Walden, Noel Harry Fred; and Racz, George, 3,788,748.

Racz, Nick S. Laminated cookware. 3,788,513, Cl. 220-64.000.

Radin, Bernard G.: *See—*
Bozoian, Michael; Krugler, Allen D., Jr.; and Radin, Bernard G., 3,788,421.

Ragen Semiconductor, Inc.: *See—*
Medwin, Albert H., 3,789,388.

Rahme, Selim R., to A-Ok Machine and Tool Company. Headlamp aiming device having a protective housing. 3,788,747, Cl. 356-121.000.

Ramachandran, Sundaresan: *See—*
Muscatell, Francis L.; Ramachandran, Sundaresan; and Reen, Orville W., 3,788,836.

Ranco Incorporated: *See—*
Adams, Jay C., 3,789,340.
Demaray, Merlin E., 3,788,386.

Ranno, Carl P.: *See—*
Sutton, Lawrence R.; Ranno, Carl P.; and Hewson, Kenneth E., 3,787,971.

Ransburg Electro Coating Corporation: *See—*
Harrison, David; and Sainz, Paul R., 3,788,555.

Rapson, William Howard, to ERCO Industries, Limited. Production of chlorine dioxide. 3,789,108, Cl. 423-478.000.

Rapuano, Robert: *See—*
Shimasaki, Nobuhiko; and Rapuano, Robert, 3,789,142.

Rasmussen, James M.: *See—*
Rasmussen, Richard A.; and Jimenez, Mariano, Jr., 3,788,662.

Rasmussen, Lyle E.: *See—*
Caruso, Philip J., Jr.; Rasmussen, Lyle E.; and Scarbrough, Joseph E., 3,789,296.

Rasmussen, Ole-Bendt. Method of manufacturing a laminated fibro-filamentary or film structure which is partly delaminated. 3,788,922, Cl. 156-244.000.

Rasmussen, Richard A.; and Jimenez, Mariano, Jr., 1/3 to Rasmussen, James M. Utility cart. 3,788,662, Cl. 280-47.110.

Ravreby, Fred A. Modular shoe rack. 3,788,241, Cl. 108-6.000.

Rawson, Robert E. Putting stroke analyser. 3,788,646, Cl. 273-183.00c.

Rayburn, Charles C., to Illinois Tool Works, Inc. Apparatus for assembling and winding a strip about head wires. 3,787,949, Cl. 29-203.00d.

Raychem Corporation: *See—*
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Check, John M.; and Brettrager, Donald R., 3,788,198.

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Reen, Orville W.: *See—*
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Rees, Richard Watkin; and Reinhardt, Hans-Georg, to Du Pont de Nemours, E. I., and Company. Reinforced resin compositions. 3,789,051, Cl. 260-41.00a.

Regie Nationale des Usines Renault: *See—*
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Rehm, Karl; and Schwarz, Hermann, to Licentia Patent-Verwaltungs-G.m.b.H. Rotating suction drum for data carriers. 3,788,636, Cl. 271-4.000.

Reiber, Helmut; and Stapelfeldt, Rolf, to International Standard Electric Corporation. Flexible antenna formed of opposed convex laminated strips covered with a heat-shrunk hose. 3,789,418, Cl. 343-872.000.

Reid, Luther J., Jr.: *See—*
Suryanarayana, Yelagondahally S.; and Reid, Luther J., Jr., 3,789,021.

Reifenberg, Gerald H.; and Gitlitz, Melvin H., to M & T Chemicals, Inc. Process for preparing symmetrical triorganolin halides. 3,789,057, Cl. 260-429.700.

Reimer, William A.; and Gerlach, Peter K., to GTE Automatic Electric Laboratories, Incorporated. Low insertion/extraction force printed wiring board connector. 3,789,345, Cl. 339-75.0mp.

Reimers, George W.; Rholl, Stephen A.; and Khalafalla, Sanaa E., to United States of America, Interior. Device and process for magneto-gravimetric particle separation using non-vertical levitation forces. 3,788,465, Cl. 209-1.000.

Reinecke, Erich: *See—*
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Reither, Thomas D.; and Trease, Ralph E., to Owens-Illinois, Inc. Hypodermic syringe with improved adhesive. 3,788,321, Cl. 128-221.000.
Reno, Frederick. Clutch actuating mechanism with automatically determined free play. 3,788,438, Cl. 192-110.00r.
Research Corporation: *See—*
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Madjid, Abdul Hamid; Vaala, Allen R.; Anderson, Walter F., Jr.; and Pedulla, Joseph, Jr., 3,788,818.
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Rettig, Charles E., to Allis, Louis, Company, The. Variable speed motor and drive circuit. 3,789,290, Cl. 321-5.000.
Rexnord, Inc.: *See—*
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Singleton, Ogle R., Jr.; and Ward, Bennie Ray, Jr., 3,788,824.
Wilson, Calvin L., 3,787,955.
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Rhodes, Warren L., to Xerox Corporation. Justification apparatus. 3,788,203, Cl. 95-4.500.
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Riccio, Pasquall R.: *See—*
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Rice, Macon D.; and Anderson, Emil G. Readily releasable interconnecting means for panels. 3,788,379, Cl. 160-235.000.
Richard, Yves Robert; Le Roi, Marly; and Mignot, Jean Marcel, to Degremont Societe Generale d'Epuration et d'Assainissement. Method and apparatus for treating liquids. 3,788,981, Cl. 210-20.000.
Richards, George B., to Fluid Device Corporation. Fluid control systems. 3,788,090, Cl. 62-139.000.
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Richardson Company, The: *See—*
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Richardson, John. Portable porch unit for mobile homes. 3,788,016, Cl. 52-66.000.
Richardson, Lilian. Hand knitting device. 3,788,102, Cl. 66-60.000.
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Rickettson, Donald F. Flexible bearer. 3,788,253, Cl. 112-402.000.
Riedel, Franz, to Kieserling, Th., & Albrecht. Mechanism for radial adjustment of tools in rotary tubular tool holders of shaving machines or the like. 3,788,170, Cl. 82-20.000.
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Roberts, Donald W., to United States of America, Navy. Recovery hook assembly. 3,788,262, Cl. 114-235.00r.
Roberts, James C. Sprinkler unit. 3,788,552, Cl. 239-276.000.
Roberts, Kent S.: *See—*
Roberts, Stanley D.; and Roberts, Kent S., 3,788,716.
Roberts Mfg., Inc.: *See—*
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Roberts, Stanley D.; and Roberts, Kent S., to Roberts Mfg., Inc. Work cabinet for sewing machine. 3,788,716, Cl. 312-29.000.
Robin, Michael; and Schulte, Sheldon R., to Ashland Oil Inc. Method of inhibiting sulfone formation in sulfonations. 3,789,067, Cl. 260-505.00e.
Robinson & Sons Limited: *See—*
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Robinson, Charles Portland, to Robinson & Sons Limited. Sanitary wear. 3,788,323, Cl. 128-291.000.
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Rogers, Rudy E.: *See—*
Murphy, James L., Jr.; Grace, Garland K.; and Rogers, Rudy E., 3,788,095.
Rogers, Winston L. Saliva ejector chin clamp. 3,787,978, Cl. 32-33.000.
Rogier, Edgar R.: *See—*
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Rohrbaugh, Donald G.; and Pearson, William R., to Beckman Instruments, Inc. Chemical analysis rotary module. 3,788,816, Cl. 23-253.00r.
Rolle, Albert L., to United States of America, Navy. Reduced bandwidth processing for ultrasonic image conversion. 3,789,350, Cl. 340-3.00r.
Rolleberg, Kjell Ove: *See—*
Assow, Bengt Holger; Jansson, Curt Evert; and Rolleberg, Kjell Ove, 3,789,288.
Rollo, Edward J., Jr.: *See—*
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Rosaen, Oscar E. Fluid pumps and motors. 3,788,783, Cl. 418-108.000.
Rose Iron Works, Inc.: *See—*
Gelles, Nicholas; Shiley, Paul J.; and Casella, Michael D., 3,788,690.
Rose, Richard Stephen; and Clark, Burton Parker, to General Electric Company. Burst firing, single barrel, armament. 3,788,191, Cl. 89-155.000.
Rosenberg, Paul: *See—*
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Rosser, Eugene P.: *See—*
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Rossie, Egbert; and Barke, Bernd, to Audi NSU Auto Union Aktiengesellschaft. Car body for motor vehicles. 3,788,686, Cl. 296-146.000.

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Rotary Profile Anstalt: *See—*
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Rouselet, Joseph, to Etablissements Rousselet. Securing device for a removable bag for a centrifuge. 3,788,480, Cl. 210-237.000.

Rowley, David S. Rear-view mirror system. 3,788,735, Cl. 350-302.000.

RTC Industries, Inc.: *See—*
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Rubenstein, Raymond D., to International Harvester Company. Hydrostatic transmission check valves with automatic unloading. 3,788,078, Cl. 60-464.000.

Rubio, Manuel; and Leal, Victor Mario, to Barrera, Roberto Gonzalez. Method and apparatus for testing adhesive properties of dough-like material. 3,788,139, Cl. 73-169.000.

Rudbarg, Frank, to FMC Corporation. Insulated pipe line for heated materials. 3,789,188, Cl. 219-301.000.

Ruff, Stanley, to Maryland Cup Corporation. Bondling method and article produced thereby. 3,788,463, Cl. 206-65.00s.

Rule, Bruce J.: *See—*
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Rumell, James A. Transport vehicle with portable cargo container. 3,788,683, Cl. 296-35.00a.

Runge, Charles H. Wire nut wrench. 3,787,948, Cl. 29-203.00h.

Rusak, Vasil, to De Laval Turbine Inc. Low specific speed compressor. 3,788,765, Cl. 415-213.000.

Rushing, Sandy S., Jr.: *See—*
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Rutt, Truman C., to N L Industries, Inc. $BaTiO_3$-MgO-$Nb_2O_5$ dielectric ceramic compositions and method. 3,788,867, Cl. 106-73.310.

Rutzick, James L. Machine support base. 3,788,581, Cl. 248-22.000.

Ryder, Robert. Earphone assembly. 3,789,164, Cl. 179-156.00r.

Rygiol, Henry V. Current transfer in connection with electric welding. 3,789,186, Cl. 219-130.000.

Ryobi, Ltd.: *See—*
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Rystad, Arnold O., to Work Right Products, Inc. Sliding door silencer. 3,787,936, Cl. 24-262.00r.

Saab-Scania Aktiebolag: *See—*
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Sabin, David A.; and Sabin, Mark A. Glove or mitten with colored mesh backing. 3,787,897, Cl. 2-158.000.

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Saito, Yoshihiro; Okada, Tomoo; Odera, Eiichi; and Matsuzawa, Teruyuki, to Fujitsu Limited. Telephone exchange equipment condition change detecting apparatus. 3,789,147, Cl. 179-18.0fa.

Sakai, Susumu: *See—*
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Salem Corporation: *See—*
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Salem, Nazih M. N. Sitting/standing table/walker combination. 3,788,695, Cl. 297-6.000.

Sammons, David G. Travel envelope with baggage ticket and baggage claim ticket. 3,788,540, Cl. 229-72.000.

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Sandlin, William C., to Ultramation Inc. Linear thruster. 3,788,196, Cl. 92-13.000.

Sandstrom, Jan Erik Stellan, to AGA Aktiebolag. Warning valve. 3,788,312, Cl. 128-142.300.

Sanitized Incorporated: *See—*
Klein, Stewart E.; and Gagliardi, D. Donald, 3,788,803.

Sarageno, Ignatius B.; and Wegmiller, Gary R., to National Cash Register Company, The. Rotary disk coin dispenser with spring tabs. 3,788,334, Cl. 133-4.00r.

Sarkisian, Arthur; and Murphy, Charles P., to International Telephone and Telegraph Corporation. Grouting composition. 3,788,081, Cl. 61-36.00r.

Sato, Akira: *See—*
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Sato, Masamichi; and Takahashi, Isozi, to Fuji Photo Film Co., Ltd. Charging method for electrophotography. 3,788,844, Cl. 96-1.00c.

Sato, Masamichi, to Fuji Photo Film Co., Ltd. Corona charge method. 3,789,222, Cl. 250-325.000.

Sato, Masamichi, to Fuji Photo Film Co., Ltd. Charging method for relatively movable electrophotographic means and corona means. 3,789,223, Cl. 350-325.000.

Sato, Msamichi; Honfo, Satoru; and Komaki, Takao, to Fuji Photo Film Co., Ltd. Process for charging electrophotographic materials. 3,789,224, Cl. 250-325.000.

Sato, Wasuke; Iriko, Fumio; Yamamoto, Sadao; Fujisawa, Mitsumaro; and Hatakeyama, Shigeyuki, to Showa Denko K.K. Method for manufacturing heavy duty bags. 3,788,199, Cl. 93-80.000.

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Sawano, Takahiro; Kabota, Katuhiko; Ando, Masaru; Wada, Moriyasu; Murayama, Tohru; and Ozawa, Tadayuki, to Tokyo Shibaura Electric Co., Ltd. Alternator rectifier assemblies with resinous molded member containing circuit pattern molded therein. 3,789,275, C. 317-234.00r.

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Scarlet, Ted. Pennant and method of making a pennant. 3,788,269, Cl. 116-173.000.

Schacht, Ezra L. Light sensitive electrical timing circuit. 3,789,220, Cl. 250-206.000.

Schacht, Henry Neil, to Pillsbury Company, The. Apparatus for cutting and packing poultry. 3,787,926, Cl. 17-11.00r.

Schaefer, Fritz, GmbH: *See—*
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Schaefer, William Edward, to Du Pont de Nemours, E. I., and Company. Explosive primer. 3,788,223, Cl. 102-24.00r.

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Schaumann, Anton; and Weber, Willi. Device for the emission of current-pulse trains particularly by telephone and teleprinter installations. 3,789,394, Cl. 340-365.00r.

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Schebalin, Sergei, to Honeywell Inc. Thick film precision resistor for use in an electrical circuit and method of making same. 3,788,891, Cl. 117-212.000.

Scheffel, Carl W., to Fox Industries, Inc. Hold-down assembly for modular expansion joints. 3,788,758, Cl. 404-56.000.

Scheidt, James E.; and White, Robert W., to Caterpillar Tractor Company. Hydraulic circuit with valve to provide semi-float control of a dozer blade. 3,788,401, Cl. 172-801.000.

Schenkels, Ferdinand Jose Maria; and Verboven, Ghislain Felix Alfons Arthur. Method of manufacturing gas-filled lamps. 3,788,724, Cl. 316-20.000.

Schenker, Barry A.; Malkin, Irving; and Taylor, Kirman, to Diamond Shamrock Corporation. Catalyst for oxidation of hydrocarbons and carbon monoxide. 3,789,022, Cl. 252-462.000.

Scherber, Werner, to Licentia Patent-Verwaltungs-G.m.b.H. Method of manufacturing an MNOS storage element. 3,788,894, Cl. 117-217.000.

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Scheuer, Raymond I. Aqueous ink for development of concealed images. 3,788,863, Cl. 106-21.000.

Schimek, Robert, to Globe-Union Inc. Plug remover. 3,787,946, Cl. 29-200.10d.

Schimmel, Ralph U.: *See—*
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Schleben, Harold G., Sr.; and Pettinga, Robert, to General Electric Company. Ammunition feeding system. 3,788,189, Cl. 89-34.000.

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Schmidt, Gunther, to Messerschmitt-Bolkow-Blohm Gesellschaft mit beschrankter Haftung. Liquid fueled rocket engine of the main current type having separate control nozzles operated from turbine exhaust gases branched off from the rocket process. 3,788,069,Cl. 60-207.000.

Schmidt, Jacob E., to McGraw-Edison Company. Air-depolarized primary battery. 3,788,900, Cl. 136-86.00a.

Schmidt, John E.: *See—*
Stephenson, Orlando W., III; and Schmidt, John E., 3,788,966.

Schmidt, Roger A.: *See—*
Taft, David D.; and Schmidt, Roger A., 3,789,044.

Schmitt, William C., to Milwaukee Faucets, Inc. Non-rise valve for faucets or the like. 3,788,601, Cl. 251-304.000.

Schneider, Herbert Anton, to Bell Telephone Laboratories, Incorporated. Ternary memory cell. 3,789,245, Cl. 307-288.000.

Schneider, Karl; Cuenoud, Gerard; Bouladon, Gabriel; and Zuppiger, Paul, to Battelle Memorial Institute. Transport system. 3,788,232, Cl. 104-88.000.

Schneider, Walter. Garbage bin. 3,788,720, Cl. 312-211.000.

Schneider, Wolfgang; Piekarek, Egbert Diethelm; and Thommes, Stefan, to Klein, Schanzlin & Becker Aktiengesellschaft. Apparatus for mounting movable devices. 3,788,580, Cl. 248-14.000.

Schnepp, James M.: *See—*
Drone, Gary A.; and Schnepp, James M., 3,788,419.

Schottmiller, John Charles; and Wood, Charles, to Xerox Corporation. Method of preparing binder layers. 3,788,889, Cl. 117-201.000.

Schreiber, Hans, to United States of America, Atomic Energy Commission. Intratracheal sampling device. 3,788,305, Cl. 128-2.00f.

Schreyer, Gerd: *See—*
Giesselmann, Gunter; Schreyer, Gerd; and Weigert, Wolfgang Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, 3,789,114.

Schroeder, Herbert H., to Minnesota Mining and Manufacturing Company. Solid propellant compositions containing lithium passivated by a coating of polyethylene. 3,788,906, Cl. 149-6.000.

Schulte, Sheldon R.: *See—*
Robin, Michael; and Schulte, Sheldon R., 3,789,067.

Schultz, Frederick C. Plate antenna with protective cover. 3,789,419, Cl. 343-873.000.

Schulz, Gunter: *See—*
Haussman, Gerhard; and Schulz, Gunter, 3,788,054.

Schulze, Herbert, to Schulze, R., & Co. KG, Firma. Adjustable picture frame holder. 3,788,589, Cl. 248-488.000.

Schulze, R., & Co. KG, Firma: *See—*
Schulze, Herbert, 3,788,589.

Schutzner, Walter, to Koreska, W. Transfer copy process and material. 3,788,875, Cl. 117-36.200.

Schwarz, Hermann: *See—*
Rehm, Karl; and Schwarz, Hermann, 3,788,636.

Schwebke, Gerald L.: *See—*
Coury, Arthur J.; Rogier, Edgar R.; Schwebke, Gerald L.; and Cozad, Douglas D., 3,789,045.

Schwerin, Guenther, to Bosch, Robert, G.m.b.H. Hydraulic brake control apparatus for a trailer hauled by a motor car. 3,788,709, Cl. 303-7.000.

Sciacero, Rinaldo: *See—*
Lugowski, Ronald J.; and Sciacero, Rinaldo, 3,788,439.

SCM Corporation: *See—*
Douthitt, Merton H., 3,788,047.
McCauley, Albert P., 3,789,104.
Vartanian, Perry H., Jr.; Markaris, Michael J.; and Anderson, Carl P., 3,788,441.

Scott, Ian J. C.: *See—*
Carter, Ivor W.; and Scott, Ian J. C., 3,788,290.
Meyer, Earl W., Jr.; Carter, Ivor W.; and Scott, Ian J. C., 3,789,168.

Scott, Ian J. C., to Chrysler Corporation. Distributor cap electrode and cable termination. 3,789,349, Cl. 339-223.00s.

Scott Paper Company: *See—*
Adams, Whitney R., 3,788,938.

Seagle, Charles E.: *See—*
Heywood, Richard D.; and Seagle, Charles E., 3,789,402.

Seale, Virgil L.; Svarz, Jerry J.; Goretta, Louis A.; Newkirk, John D.; Hunter, Wood E.; and Sibert, Frederick J., to Nalco Chemical Company. Particle size-PH effects on reduced copper oxide in preparation of acrylamide. 3,789,074, Cl. 260-561.00n.

Searle, G. D., & Co.: *See—*
Hsu, Charles F.; Jiu, James; and Mizuba, Seth Setsuo, 3,788,947.

Sebesta, George J., to Dyna Magnetic Devices, Inc. Submersion-safe microphone. 3,789,166, Cl. 179-184.000.

Seeger, Karl: *See—*
Klatt, Peter; Seeger, Karl; and Wilborn, Wolfgang, 3,788,296.

Seeger, Richard E., Jr.; and Coulter, John G., to Chomerics, Inc. Multi-output level keyboard switch assembly with improved operator and contact structure. 3,789,167, Cl. 200-5.00a.

Segerstrom, Clifford C.: *See—*
Hare, Thomas R.; and Segerstrom, Clifford C., 3,788,370.

Segond, Roger: *See—*
Patric, Jos; Lefebvre, Jacques; Segond, Roger; and Badia, Michel, 3,788,956.

Seibu Gomu Kagaku Kabushiki Kaisha: *See—*
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Sels, Francis Jeanne: *See—*
De Cat, Arthur Henri; Sels, Francis Jeanne; Pollet, Robert Joseph; and Willems, Jozef Frans, 3,788,850.
Willems, Jozef Frans; Sels, Francis Jeanne; Pollet, Robert Joseph; and De Cat, Arthur Henri, 3,788,851.

Sels, Francis Jeanne; and Pollet, Robert Joseph, to Agfa-Gevaert N.V. Surface-active compounds used as coating aids for film-forming coating compositions. 3,788,852, Cl. 96-67.000.

Seltveit, Arne: *See—*
Flood, Hakon; and Seltveit, Arne, 3,788,866.

Semancik, John R.: *See—*
Volgstadt, Frank R.; and Semancik, John R., 3,789,030.

Semisch, Gunter, to Steingass, August, & Sohn, Firma. Roof. 3,788,014, Cl. 52-18.000.

Sessions, William K., Jr.: *See—*
Tornquist, Nils M.; Kneeland, Howard; and Sessions, William K., Jr., 3,788,061.

Seymour, Errol V.: *See—*
McDermott, David C.; and Seymour, Errol V., 3,788,263.

Shah, Arvind; and Furrer, Frank, to Gesellschaft zur Frederung der Forschung an der Eidg. Techn. Hochschule. Method, and application thereof, for transmitting information over a common signal path. 3,789,145, Cl. 179-15.0bc.

Shannon, James H.: *See—*
Harenberg, Harold L., Jr.; and Shannon, James H., 3,789,356.

Shapiro, Eugene; Crane, Jacob; and Eichelman, George H., Jr., to Olin Corporation. Process for improving the elongation of grain refined copper base alloys. 3,788,902, Cl. 148-11.50r.

Shatto, Howard L., Jr.; and Van Dommelen, Johannes A. W. J., to Shell Oil Company. Well re-entry tool with bumperhead. 3,788,396, Cl. 166-.500.

Shaw, Bernard, to General Electric Company. Bulb making method. 3,788,830, Cl. 65-110.000.

Shea, James M.: *See—*
Pasek, James E.; Shea, James M.; and Tobin, Michael F., 3,787,945.

Sheil, John E. Floating platform. 3,788,254, Cl. 114-.50f.

Shell, Don C.; Tanner, David A.; and Brazzel, Ronald D. Separation process. 3,788,037, Cl. 55-58.000.

Shell Oil Company: *See—*
Hare, Thomas R.; and Segerstrom, Clifford C., 3,788,370.
McDermott, David C.; and Seymour, Errol V., 3,788,263.
Savage, William E., 3,788,478.
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Szakasits, Jolius J., 3,788,479.
Van Lookeren Campagne, Nicolaas, 3,788,281.
Whited, D. E., 3,788,719.

Shephard, Cecil A. Y., to Mobil Oil Corporation. Oil recovery process. 3,788,398, Cl. 166-269.000.

Sheppard, Harry R., to Westinghouse Electric Corporation. Insulation structure for electrical apparatus. 3,789,337, Cl. 336-60.000.

Sheridan, David S.: *See—*
Alley, Ralph D.; and Sheridan, David S., 3,788,328.

Sherman, Philip, to Instrument Development Laboratories, Inc. Domain wall propagating device. 3,789,374, Cl. 340-174.0pw.

Sherwood Medical Industries Inc.: *See—*
Alley, Ralph D.; and Sheridan, David S., 3,788,328.

Shibata, Fukuo, to Kawasaki Jukogyo Kabushiki Kaisha. Electric control system of an electric machine arrangement combining electromagnetic coupling with an electric rotating machine. 3,789,281, Cl. 318-139.000.

Shiley, Paul J.: *See—*
Gelles, Nicholas; Shiley, Paul J.; and Casella, Michael D., 3,788,690.

Shimano, Masaru: *See—*
Ayaki, Susumu; and Shimano, Masaru, 3,789,141.

Shimasaki, Nobuhiko; and Rapuano, Robert, to Communications Satellite Corporation. Frame synchronization technique for satellite on-board switching systems. 3,789,142, Cl. 179-15.0bs.
Shimazaki, Toshio; Tamei, Fumio; and Yabagida, Yoshio, to Horiba Ltd. Gas analyzer. 3,788,751, Cl. 356-246.000.
Shimoyama, Hiroshi: *See—*
Ujiie, Akira; Shimoyama, Hiroshi; and Ueda, Nanji, 3,788,558.
Shin, Hiroshi: *See—*
Matsumura, Shiro; Shin, Hiroshi; Sugano, Junichiro; Yoshii, Tadashi; Kuriyama, Yasuhisa; and Komaki, Takeshi, 3,789,115.
Shinagawa Automotive Electric Wire Co., Ltd.: *See—*
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Shipley Company, Inc.: *See—*
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Shipon, Shirley S.: *See—*
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Shirakawa, Tadashi: *See—*
Iida, Yutaka; Hishinuma, Kazuo; Hikuma, Motohiko; Shirakawa, Tadashi; and Sakai, Susumu, 3,788,952.
Shirn, George A.: *See—*
Pfister, William J.; and Shirn, George A., 3,789,274.
Shoemaker, Arthur H., to American Optical Corporation. Four component microscope eyepiece. 3,788,732, Cl. 350-220.000.
Shogren, David K., to Xerox Corporation. Imaging system. 3,788,740, Cl. 355-51.000.
Shores, Michael P.: *See—*
Guntrum, William E.; Pexton, Harold W.; and Shores, Michael P., 3,787,963.
Short, Oliver A., to Du Pont de Nemours, E. I., and Company. Production of palladium-silver alloy powder. 3,788,833, Cl. 75-.50a.
Showa Denko K.K.: *See—*
Sato, Wasuke; Iriko, Fumio; Yamamoto, Sadao; Fujisawa, Mitsumaro; and Hatakeyama, Shigeyuki, 3,788,199.
Showa Sargent Ltd.: *See—*
Osaka, Kazuhiro Sugae, 3,788,110.
Shroff, Arvind: *See—*
Kervizic, Jacques; Masic, Rene; Shroff, Arvind; and Warnecke, Robert Jean, 3,789,253.
Shroyer, Larry L.: *See—*
Weber, Carl; Shroyer, Larry L.; and Baker, James T., 3,789,210.
Shuey, Scott James; Smith, Wallace Leland; and Wilk, Harold G., to Borg-Warner Corporation. Multi-stage centrifugal pump with means for pulse cancellation. 3,788,764, Cl. 415-198.000.
Shumaker, Charles Storer, to Wean United, Inc. Method and apparatus for tensioning strip. 3,788,534, Cl. 226-4.000.
Shyne, James J.; and Milewski, John V., to General Technologies Corporation. High shear-strength fiber-reinforced composite body. 3,788,935, Cl. 161-141.000.
Sibert, Frederick J.: *See—*
Seale, Virgil L.; Svarz, Jerry J.; Goretta, Louis A.; Newkirk, John D.; Hunter, Wood E.; and Sibert, Frederick J., 3,789,074.
Sibeud, Jean Paul, to Automobiles M. Berliet. Device for measuring the specific consumption of internal combustion engines. 3,789,381, Cl. 340-207.00r.
Sick, Erwin, Firma: *See—*
Brose, Peter, 3,788,105.
Sielk, Werner, to Ford Motor Company. Operating mechanism for a motor vehicle sliding roof. 3,788,160, Cl. 74-51.00r.
Siemens Aktiengesellschaft: *See—*
Beier, Helmut; Handke, Siegfried; and Konczal, Wolfgang, 3,789,175.
Engels, Heinrich, 3,788,766.
Harz, Hermann, 3,789,282.
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Tschunt, Edgar; and Dittrich, Werner, 3,788,450.
Siemens-Albis Aktiengesellschaft: *See—*
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Siemund, Herbert A., to Greenview Manufacturing Company. Reversible sponge rubber mop, brush or duster. 3,787,919, Cl. 15-244.0ch.
Sievenpiper, Frederic Leory; and Bement, Elmore, to Allied Chemical Corporation. Solvent compositions for solvent dyeing and dyestuff solutions prepared therefrom. 3,788,811, Cl. 8-175.000.
Sievers, Jerry A.: *See—*
Bari, Jaime A.; Maffitt, Kent N.; and Sievers, Jerry A., 3,789,370.
Sigman, Daniel M., Jr., to Armstrong Cork Company. Method of embossing. 3,788,872, Cl. 117-10.000.
Sigmatek, Inc.: *See—*
Andersen, Robert A.; and Maguire, Lawrence A., 3,789,323.
Sigmon Corporation: *See—*
Sigmon, James W., 3,788,653.
Sigmon, James W., to Sigmon Corporation. Rotary fluid seal. 3,788,653, Cl. 277-70.000.
Siksai, Anthony. Automated animated display device. 3,787,991, Cl. 40-106.520.
Silbereisen, Hermann; Winterberg, Felix; and Ginzel, Severin. Hydraulic metal powder press. 3,788,787, Cl. 425-78.000.
Silver, Frederick. Strip-chart holder. 3,787,990, Cl. 40-86.00r.
Simard, Albert. Fish Scaling machine. 3,787,927, Cl. 17-64.000.
Simmen, Robert; and Chabloz, Olivier, to Mefina S.A. Fuse for nongyratory missiles. 3,788,229, Cl. 102-74.000.
Simmons, Smith H.; and Caraway, Mitchell R., to Standard Fabricated Products Co., The. Prefabricated multi-story stair assembly. 3,788,018, Cl. 52-185.000.
Simon, Paul; and Jones, Robert E., Jr., to International Business Machines Corporation. Method for manufacturing a magnetic head. 3,787,964, Cl. 29-603.000.
Simone, Dominic; and Herman, Daniel F., to N L Industries, Inc. Cellulose acetate butyrate film forming composition containing titanium dioxide microoxide. 3,789,039, Cl. 260-17.00r.
Simpson, Carl H. Neck sling pad. 3,788,308, Cl. 128-94.000.
Sinfelt, John H.: *See—*
Carter, James L.; and Sinfelt, John H., 3,789,020.
Singer Company, The: *See—*
Bonner, Alvin T., Sr., 3,788,245.
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Singer, John Jacob, Jr.: *See—*
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Singleton, Ogle R., Jr.; and Ward, Bennie Ray, Jr., to Reynolds Metals Company. Aluminous metal brazing materials. 3,788,824, Cl. 29-197.500.
Sitabkhan, Abdul N.: *See—*
Kramer, Jack M.; and Sitabkhan, Abdul N., 3,788,666.
Sivertsen, David R., to Texas Instruments, Incorporated. Multilayer microelectronic circuitry techniques. 3,789,276, Cl. 317-235.00r.
Sjostrand, Uno: *See—*
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SKF Kugellagerfabriken GmbH: *See—*
Dausch, Ernst; Kubler, Friedrich; Hempel, Theodor; and Fuchs, Franz, 3,787,933.
Diem, Rudolf, 3,787,983.
Skil Corporation: *See—*
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Skinner, James R., to M.V. Engineering & Mfg., Inc. Holder for disc-like objects. 3,788,464, Cl. 206-.820.
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Skreiner, Klaus M.: *See—*
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Skruch, Richard R.: *See—*
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Slavin, Sabina; and Kahn, Herbert L., to Perkin-Elmer Corporation, The. Gas flow controller for a heated sample cell. 3,788,752, Cl. 356-36.000.
Slick Corporation, The: *See—*
Kaeppler, Gerhard; Ficker, Stefan; and Pergande, Wilfried, 3,788,046.
Sliney, John T., to Bendix Corporation, The. Aircraft control system using inertially sensed data. 3,788,579, Cl. 244-77.00a.
Sloane, R. & G., Manufacturing Company, Inc.: *See—*
Wise, Eugene H., 3,788,928.
Slone, James C., Jr.: *See—*
Feldman, David W.; and Slone, James C., Jr., 3,789,351.
Slusher, Leonard G., to Burlington Northern, Inc. Self-tightening dunnage. 3,788,498, Cl. 214-10.50r.
Smart, William O.: *See—*
Clancy, Lawrence F.; Lee, Emil B., Jr.; Smart, William O.; and Yancey, John W., 3,788,418.
Smeets, Joseph Gerard Alphons, to International B. F. Goodrich-Europe B.V. Method and apparatus for preheating an uncured rubber tire. 3,788,785, Cl. 425-32.000.
Smith, Don G.: *See—*
Hunter, Earl Kent; and Smith, Don G., 3,789,353.
Smith, John A.; and Miller, Stephen A., to Columbia Broadcasting System, Inc. Toy blocks having panelled construction. 3,787,996, Cl. 46-25.000.
Smith, Lloyd M.; and Sayano, Kanji Frank, to United States of America, Navy. Passive ranging technique. 3,789,410, Cl. 343-112.00d.
Smith, Lucille G.: *See—*
Smith, Theodore M., 3,788,656.
Smith, Mary Kay Hrncir: *See—*
Feuerbacher, David George; and Smith, Mary Kay Hrncir, 3,788,399.
Smith, Ora E.: *See—*
Wilson, David G.; and Smith, Ora E., 3,788,466.
Smith, R. L., Gear Company: *See—*
Crooks, James W., 3,788,607.
Smith, Richard N., to Sybron Corporation. Electrodialytic recovery of acid and insoluble products from spent liquors. 3,788,959, Cl. 204-180.00p.
Smith, Ronald E.: *See—*
Presley, C. Travis; Argabright, Perry; and Smith, Ronald E., 3,789,010.
Smith, Theodore M., to Smith, Lucille G. and Smith, Theodore M.; trustees. Radio active tool holder. 3,788,656, Cl. 279-1.00a.
Smith, Theodore M.; trustees: *See—*
Smith, Theodore M., 3,788,656.
Smith, Wallace Leland: *See—*

Shuey, Scott James; Smith, Wallace Leland; and Wilk, Harold G., 3,788,764.

Smolka, Thomas Gordon; and Hrachowitz, Franz, to Gertsch AG. Spring lock. 3,788,660, Cl. 280-11.35t.

Smoot, Edward H., to Schlegel Manufacturing Company, The. Spare tire removal system. 3,787,953, Cl. 29-427.000.

Snarr, James L.: *See—*
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Snia Viscosa Societa Nazionale Industria Applicazioni Viscosa S.p.A.: *See—*
Ogata, Fumimaro; and Nagamine, Katsuhiko, 3,788,940.

Snider, Philip A., to Dotco, Inc. Rotary flow control valve for air operated tools and the like. 3,788,603, Cl. 251-345.000.

Snodgrass, John E.: *See—*
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Snowdon, Donald R.: *See—*
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Sobel, Sydney Murray, to OSF Industries, Limited. Floor area divider. 3,788,378, Cl. 160-135.000.

Societa Applicazioni Gomma Antivibranti "Saga" S.p.A.: *See—*
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Societa Italiana Telecomunicazioni Siemens S.p.A.: *See—*
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Societe Civile dite Soltex: *See—*
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Societe Civile Textile dite Socitex: *See—*
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Societe de Travaux d'Electricite et d'Electronique du Languedoc: *See—*
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Societe Financiere et Industrielle des Ateliers et Chantiers de Bretagne: *See—*
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Colin, Jean Paul, 3,788,261.
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Societe Industrielle Bull-General Electric (Societe Anonyme): *See—*
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Societe Nationale Industrielle Aerospatiale: *See—*
Ane, Jean-Pierre; Teillard, Jean-Paul; and Ouere, Emile, 3,788,352.

Societe Rateau: *See—*
Hirtz, Alfred Georges Jean; and Mech, Christian Andre Lucien, 3,788,652.

Soeda, Katsuji, to Yamamoto Electric Industrial Co., Ltd. System for stopping sewing machine needle at predetermined position. 3,788,250, Cl. 112-219.00a.

Solartron Electronic Group Limited: *See—*
Catherall, Reginald; and Knowles, Susan, 3,789,203.

Solco Basel AG: *See—*
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Soliman, Frank Yassin, to Allied Chemical Corporation. Silica-filled, high molecular weight polyolefin. 3,788,923, Cl. 156-244.000.

Solomon, Leon R.: *See—*
Goetz, Philip J.; and Solomon, Leon R., 3,789,316.

Solter, Helmut Adolf, to Schat Davits, Limited. Winch mechanism for lowering a lifeboat, launch or the like, suspended from two falls, into the water and hoisting it out of the water. 3,788,606, Cl. 254-185.000.

Solvay & Cie: *See—*
Dumoulin, Joseph; and Obsomer, Marc, 3,789,083.

Somekh, George S.: *See—*
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Somekh, George Solomon: *See—*
Kubek, Daniel John; Kosseim, Alexander Jean-Marie; and Somekh, George Solomon, 3,788,980.

Somogyc, Steve, Jr., to Measuregraph Company, The. Fabric measuring and cost computing apparatus. 3,787,981, Cl. 33-133.000.

Sonneman, Robert, to Sonneman, Robert, Associates, Inc. Counterbalanced lamp. 3,789,213, Cl. 240-69.000.

Sonneman, Robert, Associates, Inc.: *See—*
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Sopinski, Zygmunt J.: *See—*
Trimble, Lester B.; and Sopinski, Zygmunt J., 3,788,132.

Sorenson, Charles E.; and Grimmer, Jon M., to Hahn, Inc. High-clarence agricultural vehicle. 3,788,416, Cl. 180-27.000.

Sorli, Duncan C.: *See—*
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Sosnowski, John: *See—*
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South African Inventions Development Corporation: *See—*
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Southwestern Manufacturing Company: *See—*
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Space Age Industries, Inc.: *See—*
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Spacetac Incorporated: *See—*
Cocca, Theodore F.; and Sanders, Paul J., 3,787,965.
Provanzano, Salvatore R., 3,789,244.

Spadini, Paolo. Alarm wrist watch. 3,788,059, Cl. 58-23.0ba.

Sperry Rand Corporation: *See—*
Ross, Gerald F.; and Jacobson, Robert S., 3,789,413.

Spicer, Thomas L.: *See—*
McQueen, Edwin D.; and Spicer, Thomas L., 3,789,140.

Spiess, Karl: *See—*
Baberowski, Waldemar; and Spiess, Karl, 3,788,449.

Spindler, Robert G., to PPG Industries, Inc. Temperature sensor. 3,789,191, Cl. 338-24.000.

Spindler, Robert G., to PPG Industries, Inc. Electrically heated window with a temperature sensor. 3,789,192, Cl. 219-522.000.

Spirolet Corporation: *See—*
Breunsbach, Maurice C., 3,788,353.
Breunsbach, Maurice C., 3,788,557.

Spitz, Erich: *See—*
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Sprague Electric Company: *See—*
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Pfister, William J.; and Shirn, George A., 3,789,274.

Square D Company: *See—*
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Squibb, E. R., & Sons, Inc.: *See—*
Bernstein, Jack, 3,789,072.
Narayanan, Venkatachala L.; and Bernstein, Jack, 3,789,073.

St. Amand, Pierre; and Koff, Irwin, to United States of America, Navy. Uniform size particle generator. 3,788,543, Cl. 239-2.00r.

Staab, Donald C., to Cardinal Industries Incorporated. Water system in multiple grooving of pavement. 3,788,704, Cl. 299-18.000.

Stabilus Industrie- und Handelsgesellschaft mbH: *See—*
Stemmler, Hansjorg, 3,788,587.

Stade, Bertil; and Hoglund, Edward. Emission-free exhaust pipe joint and clamp therefor. 3,788,677, Cl. 285-367.000.

Staedtler, J. S.: *See—*
Glombitza, Klaus, 3,787,980.

Stahl, David E.: *See—*
Lee, Hanju; and Stahl, David E., 3,788,036.

Stahl, Karl-Heinz: *See—*
Stahl, Karl-Heinz; Stahl, Werner; and Fend, Fritz (said Stahl, Werner, and said Fend, Fritz, assors. to said), 3,788,547.

Stahl, Karl-Heinz; Stahl, Werner; and Fend, Fritz, said Stahl, Werner, and said Fend, Fritz, assors. to said Stahl, Karl-Heinz. Spraying apparatus. 3,788,547, Cl. 239-129.000.

Stahl, Werner: *See—*
Stahl, Karl-Heinz; Stahl, Werner; and Fend, Fritz, 3,788,547.

Stahlwerke Peine-Salzgitter AG: *See—*
Mensenkamp, Ewald; and Cordes, Phil Heinrich, 3,788,880.

Stahly, Frederick August; and Merrill, Stewart Henry, to Eastman Kodak Company. Liquid electrographic developers. 3,788,995, Cl. 252-62.100.

Standal, George M. Sprinkler drive. 3,788,551, Cl. 239-242.000.

Standard Brands, Incorporated: *See—*
Thompson, Kenneth N.; Johnson, Richard A.; and Lloyd, Norman E., 3,788,945.

Standard Fabricated Products Co., The: *See—*
Simmons, Smith H.; and Caraway, Mitchell R., 3,788,018.

Standard Oil Company, The: *See—*
Talsma, Herbert, 3,789,041.

Stapelfeldt, Rolf: *See—*
Reiber, Helmut; and Stapelfeldt, Rolf, 3,789,418.

Starling, Inc.: *See—*
Elwick, Keith D., 3,788,052.

Starr, Fowler K. Support cushion for childrens and invalids seats. 3,788,699, Cl. 297-390.000.

Stastor, Richard A.: *See—*
Dinger, Edward H.; and Stastor, Richard A., 3,789,291.

Statham Instruments, Inc.: *See—*
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Miller, David T., 3,788,092.

Steelcase Inc.: *See—*
McNally, Donald E., 3,788,586.

Steffes, William J., to Coleman Company, Inc., The. Tent stake. 3,788,336, Cl. 135-15.0oe.

Steiner, Edward: *See—*
Hotz, Kenneth J., Jr.; Steiner, Edward; and Fox, Gary L., 3,788,628.

Steingass, August, & Sohn, Firma: *See—*
Semisch, Gunter, 3,788,014.

Steinmann, Eugene B., Jr. Automobile trunk lock opening tool. 3,788,168, Cl. 81-3.00r.

Steltz, Douglas C., to Portec, Inc. Adjustable mounting for refuse dump truck packer plate. 3,788,501, Cl. 214-83.300.

Stemmle, Denis J., to Xerox Corporation. Moving bin sorting apparatus. 3,788,640, Cl. 271-64.000.

Stemmler, Hansjorg, to Stabilus Industrie- und Handelsgesellschaft mbH. Resilient column. 3,788,587, Cl. 248-400.000.

Stephanoff, Louis J., to FMC Corporation. Linear motor conveyor. 3,788,447, Cl. 198-41.000.

Stephens, Paul F., to Bethlehem Steel Corporation. Refractory sand molds and cores. 3,788,864, Cl. 106-38.300.

Stephens, Richard Wilson: *See—*
Giacoma, Frederick Alfred, Jr.; Godbold, Channing W.; and Stephens, Richard Wilson, 3,788,514.

Stephenson, Orlando W., III; and Schmidt, John E., to BASF Wyandotte Corporation. Electrical connections for metal electrodes. 3,788,966, Cl. 204-256.000.

Stepper, Heinz J.: *See—*

Bell, Heinz G.; and Stepper, Heinz J., 3,789,255.

Stern, Ernest: *See—*
Waldron, Richard A.; and Stern, Ernest, 3,789,327.

Sternberg, Ronald Frederick; Koppelmann, Roger Fred; and Mill, Rolf K., to United States of America, Navy. Passive holography system. 3,789,354, Cl. 340-5.00h.

Stewart, Graham G.; and Earl, Allan E., to Labalt Breweres of Canada, Limited. Extraction and purification of maltotriose and maltotetrose. 3,788,910, Cl. 195-11.000.

Stewart, Stanly J. Elongated liquid marker. 3,788,753, Cl. 401-134.000.

Stiff, Rodney Allan; and Ruback, Keith Leonard, to Massey-Ferguson (Australia) Limited. Trash separator for sugar cane harvesters. 3,788,048, Cl. 55-406.000.

Stiles, Alvin B., to Du Pont de Nemours, E. I., and Company. Preparation of catalysts useful in oxidation of SO gases. 3,789,019, Cl. 252-440.000.

Still, Carl, Firma: *See—*
Tippmer, Kurt; and Laufhutte, Dieter, 3,789,105.

Stone, Charles W., to Zimmerman, D. W., Mfg., Inc. Apparatus for moving an object along a predetermined path. 3,788,491, Cl. 212-25.000.

Stop-Motion Devices Corporation: *See—*
Tellerman, Edward M., 3,788,363.

Stracke, Wilfried; and Zimmermann, Max, to Aktiengesellschaft Brown, Boveri & Cie. Nuclear power plant having a closed gas cooling circuit. 3,788,944, Cl. 176-60.000.

Strang, Charles D., to Outboard Marine Corporation. Multi-powerhead outboard motor. 3,788,266, Cl. 115-17.000.

Strazik, William F.: *See—*
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Perry, Eli; and Strazik, William F., 3,789,080.

Striebich, Alfred: *See—*
Baumann, Reinhold; Kunze, Ernst-Gunter; Lauerbach-Lehmeier, Robert; Striebich, Alfred; and Rothe, Hans-Joachim, 3,789,026.

Strohecker, Daniel E., to Battelle Development Corporation. Humidity indication. 3,788,128, Cl. 73-73.000.

Stromberg Carlson Corporation: *See—*
Richards, Glenn L., 3,789,151.

Strong, William A., to Brunswick Corporation. Anti-cavitation means for marine propulsion device. 3,788,267, Cl. 115-17.000.

Stuemky, Robert E.: *See—*
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Stumphauzer, William C.: *See—*
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Suchka, Michael B., to Lakeland Enterprises, Inc., mesne. Seedling tray insert. 3,788,002, Cl. 47-34.130.

Sueyoshi, Tohru: *See—*
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Sueyoshi, Toshihiko; and Kozawa, Mitsuo, to Japan Steel Works Ltd. Process for injection molding polyester premixes. 3,789,103, Cl. 264-329.000.

Sugahara, Eisuke. Wear resistant guides for clutch shoe. 3,788,436, Cl. 192-88.00b.

Sugano, Junichiro: *See—*
Matsumura, Shiro; Shin, Hiroshi; Sugano, Junichiro; Yoshii, Tadashi; Kuriyama, Yasuhisa; and Komaki, Takeshi, 3,789,115.

Sugawara, Yoshiaki: *See—*
Izawa, Shinichi; Toyama, Kunio; Sugawara, Yoshiaki; Tanaka, Tsutomu; and Okamoto, Hidehiro, 3,789,054.

Sugiura, Muneharu; and Hirose, Ryusho, to Canon Kabushiki Kaisha. Two point focus variable magnification lens system. 3,788,731, Cl. 350-184.000.

Sugiyama, Masayoshi: *See—*
Hirose, Hidenori; Tsubosaki, Masaaki; Sugiyama, Masayoshi; Skkita, Akira; and Kito, Mitsuo, 3,788,503.

Sullivan, James D., to Monsanto Company. Functional fluid compositions. 3,788,992, Cl. 252-47.500.

Sumitomo Electric Industries, Ltd.: *See—*
Takeo, Keinosuke; Katsumata, Tomoaki; and Hijikata, Akimitsu, 3,788,120.

Sun Electric Corporation: *See—*
Trussell, Gerald C., 3,788,129.

Sun Industries Incorporated: *See—*
Potsch, George; and Poetsch, Karl Friedrich, 3,788,180.

Sun Oil Company: *See—*
Kirk, Merritt C., Jr., 3,788,971.

Sun Oil Company of Pennsylvania: *See—*
Kirk, Merritt C., Jr., 3,788,976.

Sun Research and Development Co.: *See—*
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Suryanarayana, Yelagondahally S.; and Reid, Luther J., Jr., to Ciba-Geigy Corporation. Catalyst for the production of cyanuric chloride. 3,789,021, Cl. 252-446.000.

Sustarsic, John D.: *See—*
Edgar, William D.; Sustarsic, John D.; and Konzler, Roymond C., 3,788,236.

Susuki, Rinnosuke; Hoshi, Hiroshi; and Umeya, Kaoru, to Lion Fat and Oil Co., Ltd. Method of manufacturing artificial logs. 3,788,919, Cl. 156-184.000.

Sutton, Charles B.: *See—*
Degioia, Peter A.; and Sutton, Charles B., 3,788,714.

Sutton, Lawrence R.; Ranno, Carl P.; and Hewson, Kenneth E., to Performance Industries, Inc. Carpet trim cutter. 3,787,971, Cl. 30-293.000.

Sutton, Robert S., to Ex-Cell-O Corporation. Tool holder for use with automatic tool changing apparatus. 3,788,657, Cl. 279-173.000.

Suyderhoud, Henri George: *See—*
Campanella, Samuel Joseph; Suyderhoud, Henri George; and Onufry, Michael, Jr., 3,789,165.

Suzuki, Akira; Kinoshita, Shushi; and Ueda, Takeshi, to Kobe Steel, Ltd. Method of processing steel material having high austenitic grain-coarsening temperature. 3,788,903, Cl. 148-12.100.

Suzuki, Seigo: *See—*
Idei, Gijun; Onoyama, Atsushi; Aihara, Mitsuo; Suzuki, Seigo; Egawa, Hideharu; and Yamaga, Eiichi, 3,788,058.

Suzuki, Shizuo: *See—*
Watanabe, Teruji; Fukui, Takasuke; and Suzuki, Shizuo, 3,789,234.

Suzuki, Tadao, to Denki Kaguku Kogyo Kabushiki Kaisha. Apparatus for fabricating synthetic resin articles by double rotation of a mold. 3,788,792, Cl. 425-429.000.

Svarz, Jerry J.: *See—*
Seale, Virgil L.; Svarz, Jerry J.; Goretta, Louis A.; Newkirk, John D.; Hunter, Wood E.; and Sibert, Frederick J., 3,789,074.

Swanquist, Wesley W., to All-Steel Inc. Connector for non-metallic sheathed cable. 3,788,582, Cl. 248-56.000.

Sweeney, Thomas E.; Condit, Philip M.; and Ormiston, Robert A. Semi-rigid airfoil for airborne vehicles. 3,788,578, Cl. 244-3.280.

Sweeny, Norman P.: *See—*
Beck, Warren R.; and Sweeny, Norman P., 3,787,908.

Switzgable, Harold. Adjustable garage door lock. 3,788,678, Cl. 292-7.000.

Sybron Corporation: *See—*
Crandall, William B.; and Lee, Charles M., Jr., 3,788,874.
Smith, Richard N., 3,788,959.

Symmons, Paul C. Single handle water mixing valve. 3,788,354, Cl. 137-625.400.

Synalloy Corporation: *See—*
Carpenter, William T., 3,788,809.

Synthane-Taylor Corporation: *See—*
Messersmith, Eugene, 3,788,460.

Systems Research Laboratories, Inc.: *See—*
Buechler, Lester W., 3,788,741.

Szakasits, Jolius J., to Shell Oil Company. Disc conveyor flame ionization detectors. 3,788,479, Cl. 210-198.00c.

Szeverenyi, Nikolaus A.; and Thompson, David F., to GTE Sylvania Incorporated. Pressure sensor device. 3,789,338, Cl. 337-3.000.

Taft, David D.; and Schmidt, Roger A., to Ashland Oil Inc. Novel cured compositions prepared from the reaction of a polyisocyanate and a hydroxybenzoic acid capped epoxide containing material. 3,789,044, Cl. 260-18.0tn.

Taguchi, Seiichi; and Mizuki, Eiichi, to Fuji Photo Film Co., Ltd. Negative-working photographic process utilizing heat bleachable thin layer of a dye. 3,788,849, Cl. 96-48.0hd.

Taisho Pharmaceutical Co., Ltd.: *See—*
Ito, Shoichi; Ninomiya, Mikio; and Uchida, Hidekuni, 3,789,068.

Takachiho Koeki Kabushiki Kaisha: *See—*
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Itoh, Takayuki, 3,789,386.

Takahashi, Isozi: *See—*
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Takahashi, Nagashige, to Olympus Optical Co., Ltd. Endoscope. 3,788,304, Cl. 128-6.000.

Takeo, Keinosuke; Katsumata, Tomoaki; and Hijikata, Akimitsu, to Sumitomo Electric Industries, Ltd. Apparatus for hot-stretching steel wire and cable. 3,788,120, Cl. 72-342.000.

Takeuchi, Satoshi; and Saito, Hachiro, to Dai Nippon Insatsu Kabushiki Kaisha. Method for recording a visible image on a substrate by using an electroconductive toner. 3,788,738, Cl. 355-17.000.

Taki, Hiroaki, to Nippon Accumulator Kabushiki Kaisha. Device for mounting a bladder in an accumulator. 3,788,358, Cl. 138-30.000.

Takimoto, Masaaki: *See—*
Osawa, Sadao; Tamai, Yasuo; and Takimoto, Masaaki, 3,788,845.

Talsma, Herbert, to Standard Oil Company, The. Melamine-formaldehyde resins containing calcium carbonate. 3,789,041, Cl. 260-17.300.

Tamai, Yasuo: *See—*
Osawa, Sadao; Tamai, Yasuo; and Takimoto, Masaaki, 3,788,845.

Tamei, Fumio: *See—*
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Tanaka, Hideki: *See—*
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Tanaka, Katushi: *See—*
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Tanaka, Tsutomu: *See—*
Izawa, Shinichi; Toyama, Kunio; Sugawara, Yoshiaki; Tanaka, Tsutomu; and Okamoto, Hidehiro, 3,789,054.

Tanaka, Yoshio, to Ideal Soap Company. Continuous process for producing transparent soap having pearlescent qualities. 3,789,011, Cl. 252-367.000.

Tannenbaum, Stanley: *See—*
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Tanner, David A.: *See—*
Shell, Don C.; Tanner, David A.; and Brazzel, Ronald D., 3,788,037.
Tanner, Hal W., Jr.: *See—*
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Tauster, Samuel J., to Esso Research and Engineering Company. Catalyst impregnation technique. 3,789,025, Cl. 252-465.000.
Taylor, Donald O.: *See—*
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Taylor, Jack: *See—*
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Taylor, James B., to Trans-Canada Resources Ltd. Process for plugging formations. 3,788,405, Cl. 175-72.000.
Taylor, James F., to Design Dimension, Inc. Amphibious vehicle. 3,787,910, Cl. 9-1.00t.
Taylor, John W., Jr., to Westinghouse Electric Corporation. Radar apparatus. 3,789,396, Cl. 343-5.0dp.
Taylor, Kirman: *See—*
Schenker, Barry A.; Malkin, Irving; and Taylor, Kirman, 3,789,022.
Taylor, Robin: *See—*
Burns, William E.; and Taylor, Robin, 3,788,499.
Taylor, S. G., Chain Company, Inc.: *See—*
Booth, Richard L., 3,788,062.
Teggelaar, Claude; and De Bruyn, William T., to Wolverine Industries, Inc. Self-releasing frictional window sash balance. 3,788,006, Cl. 49-417.000.
Teillard, Jean-Paul: *See—*
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Teletype Corporation: *See—*
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McQueen, Edwin D.; and Spicer, Thomas L., 3,789,140.
Tellerman, Edward M., to Stop-Motion Devices Corporation. Control means for textile producing machines. 3,788,363, Cl. 139-336.000.
Tellier, Jacques C. T., to GAF Corporation. Ink receiving matte sheet materials overcoated with alkylated vinylpyrrolidone polymers. 3,788,881, Cl. 117-73.000.
Tendler, Robert K. Wall hanger. 3,788,588, Cl. 248-467.000.
Teng, James; Lucas, James M.; and Pyler, Richard E., to Anheuser-Busch, Incorporated. Method of removing oil spills. 3,788,984, Cl. 210-30.000.
Tenneco Chemicals, Inc.: *See—*
Ferstenberg, Charles, 3,788,535.
Tennyson, James J., to United States of America, Navy. Expendable submarine receiving antenna. 3,788,255, Cl. 114-20.00r.
Tensator, Limited: *See—*
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Terada, Toshimichi, to Hitachi, Ltd. Device for gaining random access to video signal information for use in video tape recorders. 3,789,138, Cl. 178-6.60a.
Terenzoni, Amerigo. Method for making a fabricated wooden product. 3,788,372, Cl. 144-316.000.
Terral, Ben D.; and McGowen, Harold E., Jr., to Camco, Incorporated. Kickover tool. 3,788,397, Cl. 166-117.500.
Terry, Raymond M. Smoke generator. 3,788,301, Cl. 126-59.500.
Teton, Alvan. Gas concentration measuring. 3,788,124, Cl. 73-19.000.
Tetra Pak Developpment SA: *See—*
Folkesson, Bertil; Nilsson, Lennart; and Sjostrand, Uno, 3,788,028.
Tetra Pak International AB: *See—*
Martensson, Kjell Halvard; Linde, Bjorn H:Son; Palsson, Jan-Frederik; and Jerre, Sven Torsten, 3,788,033.
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Textron, Inc.: *See—*
Moertel, George B.; and Johnston, James R., 3,787,952.
Tharp, Jack L. Roller bearing for logging truck and trailer. 3,788,672, Cl. 280-404.000.
Thayer, Victor R., to Canadian General Electric Company, Limited. Modified system for heavy water production. 3,789,113, Cl. 423-580.000.
Thevenaz, Jean: *See—*
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Thiokol Chemical Corporation: *See—*
Dawbarn, Henry D., 3,788,364.
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Thomas, Douglas W., to American Home Products Corporation. Overcap safety mechanism for an aerosol container. 3,788,523, Cl. 222-153.000.
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Thomas 1970 Trust, The, mesne: *See—*
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Thommes, Stefan: *See—*
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Thompson, Darrell R., to Du Pont de Nemours, E. I., and Company. Coating compositions containing polymeric dispersing aids. 3,788,996, Cl. 252-62.540.
Thompson, David F.: *See—*
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Thompson, Kenneth N.; Johnson, Richard A.; and Lloyd, Norman E., to Standard Brands, Incorporated. Process for isomerizing glucose to fructose. 3,788,945, Cl. 195-31.00f.
Thomson, John Ira; and Hensley, Ralph T., 10% to Lee, Raymond, Organization, Inc., The. Roll paper dispenser. 3,788,573, Cl. 242-55.200.
Thomson, Richard Noel: *See—*
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Thomson-CSF: *See—*
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Thornblad, Rulf Filip Gunnar, to Globelite Batteries Canada, Limited. Storage batteries. 3,788,901, Cl. 136-170.000.
Thornton, Marvin L.; and Riccio, Pasquall R., to Ciba-Geigy Corporation. Compressed air aspirating and propellant actuated fluid product dispenser. 3,788,525, Cl. 222-193.000.
Thornton, Marvin L.; and Riccio, Pasquale R., to Ciba-Geigy Corporation. Compressed air operated dispenser with mechanical force multiplying means. 3,788,526, Cl. 222-193.000.
Thorpe, Merle L., to Humphreys Corporation. Method of rock cutting employing plasma stream. 3,788,703, Cl. 299-14.000.
Tiemens, Ulf: *See—*
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Tilley, Henry T. Hydraulic front-wheel propulsion system for harvesting vehicles. 3,788,415, Cl. 180-26.00r.
Tippmer, Kurt; and Laufhutte, Dieter, to Still, Carl, Firma. Ammonia-hydrogen sulfide-cycle scrubbing method for crude coke oven cases. 3,789,105, Cl. 423-234.000.
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Toboll, Carl L. Bulk material handling system. 3,788,702, Cl. 298-22.0ae.
Toczyski, Stevan Leslaw. Mixing apparatus and method. 3,788,609, Cl. 259-5.000.
Tognella, Ugo R.: *See—*
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Tokusyu Acrosol Company, Ltd.: *See—*
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Idei, Gijun; Onoyama, Atsushi; Aihara, Mitsuo; Suzuki, Seigo; Egawa, Hideharu; and Yamaga, Eiichi, 3,788,058.
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Tomita, Yoshifumi; and Akeyama, Masamoto, to Hitachi, Ltd. Method of manufacturing shadow masks. 3,787,939, Cl. 29-25.110.
Tomiwa, Hiroshi, to Matsuo Electric Company. Chip-shaped, non-polarized solid state electrolytic capacitor and method of making same. 3,787,961, Cl. 29-570.000.
Tonkin, Kenneth J.: *See—*
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Torii, Michihiro: *See—*
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Tornquist, Nils M.; Kneeland, Howard; and Sessions, William K., Jr., to New England Clock Company. Illuminated dial watch. 3,788,061, Cl. 58-50.00r.
Toroid Corporation: *See—*
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Torrington Company, The: *See—*

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Toth, Steve, to Ford Motor Company. Valve stem oil seal and lubricator. 3,788,295, Cl. 123-188.00p.

Towne, Delbert D.; and Zell, Michael N., to International Business Machines Corporation. Speed control for stepper motors by torque transfer. 3,789,286, Cl. 318-696.000.

Towner Manufacturing Company: *See—*
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Towns, Marion L., to Honeywell Information Systems, Inc. Apparatus for deskewing data signals in a multi-track recording system. 3,789,400, Cl. 340-174.10b.

Toyama, Kunio: *See—*
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Toyo Seikan Kaisha, Ltd.: *See—*
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Trans-Canada Resources Ltd.: *See—*
Taylor, James B., 3,788,405.

Traubel, Harko; and Klebert, Wolfgang, to Bayer Aktiengesellschaft. Microporous sheet structure. 3,789,027, Cl. 260-2.5ay.

Traubel, Harro; Weber, Karl-Arnold; Koch, Otto; and Konig, Klaus, to Bayer Aktiengesellschaft. Fiber fleeces and synthetic leathers. 3,788,887, Cl. 117-135.500.

Trease, Ralph E.: *See—*
Reither, Thomas D.; and Trease, Ralph E., 3,788,321.

Trecker, David John: *See—*
Colomb, Henry Octave, Jr.; Trecker, David John; and Brotherton, Thomas Kemper, 3,789,042.

Triggiani, Leonard V.; and Sanchez, Moises G., to Grace, W. R., & Co. Process for preparing multi-component nuclear fuels. 3,789,013, Cl. 252-301.10s.

Trihey, John Massey, to Vulcan Australia Limited. Apparatus for producing folded strip material. 3,788,121, Cl. 72-381.000.

Trimble, Lester B.; and Sopinski, Zygmunt J., to Jo-Line Tools, Inc. Torque wrench. 3,788,132, Cl. 73-139.000.

Tripp, Robert W., to Inductosyn Corporation. Digital/analog converter with amplitude and pulse-width modulation. 3,789,393, Cl. 340-347.0da.

Trocino, Frank S. Method of extracting wax from bark. 3,789,058, Cl. 260-412.800.

True, Harry Edward, to Harrico Developments Limited. Apparatus for printing on textile fabric. 3,788,106, Cl. 18-5.00d.

Trussell, Gerald C., to Sun Electric Corporation. Select signal engine diagnosing apparatus. 3,788,129, Cl. 73-116.000.

TRW, Inc.: *See—*
MacKenzie, George D., 3,788,997.

Tschanen, Hanspeter: *See—*
Geng, Peter; Gueniat, Robert; Zollinger, Alfred; Luscher, Walter; Schawalder, Hansjorg; and Tschanen, Hanspeter, 3,788,368.

Tschunt, Edgar; and Dittrich, Werner, to Siemens Aktiengesellschaft. Device for transporting containers. 3,788,450, Cl. 198-131.000.

Tsubosaki, Masaaki: *See—*
Hirose, Hidenori; Tsubosaki, Masaaki; Sugiyama, Masayoshi; Skita, Akira; and Kito, Mitsuo, 3,788,503.

Tsujino, Takuichi, to Freund Inc. Co., Ltd. Process for the preparation of enteric medicaments. 3,789,117, Cl. 424-35.000.

Tucker, Herbert D.: *See—*
Gray, Thomas J.; DeClaire, James H.; and Tucker, Herbert D., 3,788,664.

Tufts, Howard L., to Pyrotector Incorporated. Fire extinguishing system and valve for use therewith. 3,788,400, Cl. 169-11.000.

Tuite, Robert J., to Eastman Kodak Company. Photographic element containing an oil-soluble vinylene brightening agent. 3,788,854, Cl. 96-82.000.

Tuite, Robert J. Brightening composition containing a hydrophilic colloid and an oil-soluble vinylene brightening agent. 3,789,012, Cl. 252-301.20w.

Tuller, Harold W.: *See—*
Curtis, Omer E., Jr.; Tuller, Harold W.; and Nussbaum, Ralph W., 3,789,038.

Tura, Natale G. Devices for piercing tubes in closed pressure systems and for charging the latter. 3,788,345, Cl. 137-318.000.

Turtle, Quentin C., to General Signal Corporation. Electroacoustical flow metering apparatus. 3,788,140, Cl. 73-194.00a.

Tusch, Nicholas Norbert; Watson, Robert Ian; and Taylor, Jack, to Colebrand, Limited. Underwater spraying apparatus. 3,788,273, Cl. 118-50.000.

Tyler, Robert P., to Wallace-Murray Corporation. Cutting tools with round face tooth inserts. 3,788,182, Cl. 83-835.000.

U-Line Corporation: *See—*
Graves, Richard A., 3,788,089.

Uchida, Hidekuni: *See—*
Ito, Shoichi; Ninomiya, Mikio; and Uchida, Hidekuni, 3,789,068.

Udy, Lex Lynn; Jessop, Harvey Allred; and Wasson, Daniel Aaron, to Ireco Chemicals. . 3,788,909, Cl. Aqueous blasting compositions.

Ueda, Nanji: *See—*
Ujiie, Akira; Shimoyama, Hiroshi; and Ueda, Nanji, 3,788,558.

Ueda, Takeshi: *See—*
Suzuki, Akira; Kinoshita, Shushi; and Ueda, Takeshi, 3,788,903.

Ueda, Toshio: *See—*
Yamazaki, Eiich; Maruyama, Koichi; and Ueda, Toshio, 3,788,200.

Ueno, Hiroshi: *See—*
Kishimoto, Akira; Kirata, Sadao; and Ueno, Hiroshi, 3,789,085.

Ujiie, Akira, to Mitsubishi Jukogyo Kabushiki Kaisha. Apparatus for constructing substantially circular cross-section vessel by welding. 3,788,384, Cl. 164-252.000.

Ujiie, Akira; Shimoyama, Hiroshi; and Ueda, Nanji, to Mitsubishiki Jukogyo Kabushiki Kaisha and Koike Sanso Kogyo Kabushiki Kaisha. Cutting torch. 3,788,558, Cl. 239-424.000.

Ultramation Inc.: *See—*
Sandlin, William C., 3,788,196.

U.M.C. Industries, Inc.: *See—*
Johnson, Raymond Arthur, 3,788,333.

Umeya, Kaoru: *See—*
Susuki, Rinnosuke; Hoshi, Hiroshi; and Umeya, Kaoru, 3,788,919.

Underwood, William, Company: *See—*
Malaney, Samuel T.; and McManers, John W., 3,788,302.

Unger, Burton Abram, to Bell Telephone Laboratories, Incorporated. Manufacture and testing of thin film circuitry. 3,788,911, Cl. 156-3.000.

Uniflo Systems Company: *See—*
Bloomfield, Roger D., 3,788,231.

Union Carbide Corporation: *See—*
Caflisch, Edward G.; Reed, Denvil E., Jr.; and Williamson, Kenneth D., 3,788,979.
Colomb, Henry Octave, Jr.; Trecker, David John; and Brotherton, Thomas Kemper, 3,789,042.
Kosseim, Alexander J.; and Somekh, George S., 3,789,077.
Kubek, Daniel John; Kosseim, Alexander Jean-Marie; and Somekh, George Solomon, 3,788,980.

Union Special Maschinenfabrik G.m.b.H.: *See—*
Haak, Gunter, 3,788,251.

United Aircraft Corporation: *See—*
Brock, Larry D.; Games, John E.; and Saunders, John, 3,789,391.
Games, John E., 3,789,197.
Markowski, Stanley J., 3,788,065.
Reynolds, Allan L., 3,789,322.

United Kingdom of Great Britain and Northern Ireland, Secretary of State for Defense in Her Britannic Majesty's Government of the: *See—*
Carlisle, Denis Richard; and Nichols, John Joseph, 3,788,067.

United McGill Corporation: *See—*
Lyon, Richard S.; and Lyon, Ralph L., 3,789,109.

United Recording Electronics Industries: *See—*
Putnam, Milton T.; and Cooper, Duane H., 3,789,328.

United States of America
Agriculture: *See—*
Harper, Robert J., Jr.; Gautreaux, Gloria A.; Bruno, Joseph S.; and Donoghue, Matthew J., 3,788,804.
Air Force: *See—*
Blymiller, Arthur L.; and Snodgrass, John E., 3,789,399.
Nielsen, Alan H., 3,789,405.
Army: *See—*
Burkness, Donald C.; and Warlick, William W., Jr., 3,789,390.
Conklin, Clement L., Jr., 3,788,351.
Army, mesne: *See—*
Keenan, Michael G.; Lynch, William M.; and Priedigkeit, John H., 3,789,412.
Atomic Energy Commission: *See—*
Eichner, Fred N.; and Kocher, Leo F., 3,789,227.
Freedman, Norman S., granted to United States Atomic Energy Commission under the provision of 42 U.S.C. 2182; Horsting, Carel W.; Lawrence, Walter F.; and Carrona, John J., 3,787,958.
Goldblatt, Maxwell; and McInteer, Berthus B., 3,788,814.
Goldie, Charles H.; and Fernald, Robert A., 3,789,214.
Krawetz, Barton; Long, Jack B.; and Mooney, Leonard J., 3,789,321.
Mancebo, Lloyd, 3,789,310.
Markley, Finley W., 3,788,482.
Rhodes, Charles K., 3,789,319.
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Health, Education and Welfare: *See—*
Noble, Jack E.; and Johnston, Richard P., 3,788,772.
Interior: *See—*
Kohl, Arthur L., 3,788,953.
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National Aeronautics and Space Administration: *See—*
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Clifton, John R.; and Edwards, Gary S., 3,788,227.
Coleman, H. Paris, 3,789,417.
Dixon, Earl; and Landry, Norman Richard, 3,789,330.
Feldman, David W.; and Slone, James C., Jr., 3,789,351.
Friedman, Moshe; and Herndon, Melvin, 3,789,257.
Hoffman, Eric J.; and Loessi, Jack C., 3,789,303.
Hunter, Earl Kent; and Smith, Don G., 3,789,353.
Lile, Derek L.; and Collins, David A., 3,789,369.
Marrero, Michael T., 3,789,305.
Murphree, Francis J., 3,789,128.
Plizak, Bruno T., 3,788,393.

Roberts, Donald W., 3,788,262.
Rolle, Albert L., 3,789,350.
Smith, Lloyd M.; and Sayano, Kanji Frank, 3,789,410.
St. Amand, Pierre; and Koff, Irwin, 3,788,543.
Sternberg, Ronald Frederick; Koppelmann, Roger Fred; and Mill, Rolf K., 3,789,354.
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United States Steel Corporation: *See—*
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Unitika Kabushiki Kaisha: *See—*
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Universal Instruments Corporation: *See—*
Ackerman, Daniel W., 3,788,367.

Universal Oil Products Company: *See—*
Donaldson, George R., 3,788,975.

University of Virginia, The: *See—*
Gainer, John L., 3,788,468.

Updike, Stuart J.: *See—*
Hicks, George P.; and Updike, Stuart J., 3,788,950.

Upgenoorth, Angelika: *See—*
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Upjohn Company, The: *See—*
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U.S. Amada, Ltd.: *See—*
Daniels, Dennis, 3,788,760.

U.S. Philips Corporation: *See—*
Groh, Gunther; and Tiemens, Ulf, 3,788,726.
Polman, Jan; Van der Werf, Jan Evert; and Drop, Peter Cornelis, 3,789,266.
Vollhardt, Dietrich, 3,789,272.

Usui, Keizauburo; and Yamaguchi, Michio, to Nissan Motor Company, Limited. Safety device for motor vehicle. 3,788,669, Cl. 280-150.0ab.

Uyeda, Tom M.: *See—*
Milette, Kenneth A.; Uyeda, Tom M.; and Quintana, Elias D., 3,788,342.

Vaala, Allen R.: *See—*
Madjid, Abdul Hamid; Vaala, Allen R.; Anderson, Walter F., Jr.; and Pedulla, Joseph, Jr., 3,788,818.

Valente, Raymond L.; and Bonomo, Otto A., to Manco Mfg. Co. Auto space mechanism for fabricating apparatus. 3,787,947, Cl. 29-208.00c.

Vallier, Raymond G., to Western States Envelope Company. Cutting press. 3,788,179, Cl. 83-437.000.

Valvassori, Alberto: *See—*
Longi, Paolo; Cameli, Nazzareno; Valvassori, Alberto; Parodi, Sandro; and Cervi, Remo, 3,789,036.

Van den Bulcke, Emile Oscar Julien. Method and apparatus for cooling wire rod. 3,788,618, Cl. 266-3.00r.

Van der Kolk, Hans-Jurgen, to Bosch, Robert, G.m.b.H. Hydraulic control and regulating apparatus for an adjustable pump. 3,788,773, Cl. 417-213.000.

van der Linde, Aart: *See—*
Piepers, Gijsbrecht Gerhardus; Vons, Leonard Hendrik; van der Linde, Aart; and Ljbrink, Eduard, 3,789,184.

Van der Werf, Jan Evert: *See—*
Polman, Jan; Van der Werf, Jan Evert; and Drop, Peter Cornelis, 3,789,266.

Van Dommelen, Johannes A. W. J.: *See—*
Shatto, Howard L., Jr.; and Van Dommelen, Johannes A. W. J., 3,788,396.

Van Gilst, Carl, to Bangor Punta Operation, Inc. Animal enclosure and gate therefor. 3,788,280, Cl. 119-99.000.

Van Gossum, Lucien Janbaptist: *See—*
Van Paesschen, August Jean; Van Gossum, Lucien Janbaptist; and Preim, Jan Josef, 3,788,856.

Van Heyningen, Roger S.: *See—*
Hoadley, Harvey O.; Wolfe, Robert N.; Palmer, Beverly F.; and Van Heyningen, Roger S., 3,788,171.

van Horik, Leonard R.: *See—*
Chester, Frank S.; Johnson, Claude O.; Kavanagh, Ira Keith; and van Horik, Leonard R., 3,788,117.

Van Laar, Jacobus; and Felthuis, Jacob, to Hoogovens Ijmuiden B.V. Furnace. 3,788,622, Cl. 266-32.000.

Van Lookeren Campagne, Nicolaas, to Shell Oil Company. Process and waste-heat boiler for cooling soot-containing synthesis gas. 3,788,281, Cl. 122-7.00r.

Van Paesschen, August Jean; Van Gossum, Lucien Janbaptist; and Preim, Jan Josef, to Agfa-Gevaert N.V. Plural coated sheet material containing photosensitive semiconductive particles. 3,788,856, Cl. 96-87.00r.

Van Poucke, Raphael Karel; and Pollet, Robert Joseph, to Agfa-Gevaert N.V. Method of incorporating photographic adjuvants into hydrophilic colloids. 3,788,857, Cl. 96-100.000.

Van Raalte, John A.; and Christiano, Victor, to RCA Corporation. Method of producing a window device. 3,788,892, Cl. 117-212.000.

Vancil, Rayburn D., to Olin Corporation. Vehicle safety device. 3,788,667, Cl. 280-150.0ab.

Vancini, Carlo A.: *See—*
Arnold, Orlan M.; and Vancini, Carlo A., 3,788,045.

Varney, Robert E., to FMC Corporation. Inclined conveyor for handling fragile articles. 3,788,453, Cl. 198-153.000.

Varnum, James M.: *See—*
Arp, Leon J.; and Varnum, James M., 3,788,313.

Vartanian, Perry H., Jr.; Markaris, Michael J.; and Anderson, Carl P., to SCM Corporation. Editing typewriter with corresponding motion of recorder elements. 3,788,441, Cl. 197-1.00r.

Vasel, Alfred W., to Pyrotector, Incorporated. Smoke detector with means for compensating for variations in light source brightness due to line voltage variations. 3,789,383, Cl. 340-237.00s.

Vause, Arthur Samuel, to Thorn Electrical Industries, Limited. Electrically conductive components. 3,788,721, Cl. 316-17.000.

Vddeholms Aktiebol AG: *See—*
Holm, Kurt Anders, 3,788,459.

Veen, James C., Jr., to Hillsdale Industries, Inc. Drop away fire vent. 3,788,013, Cl. 52-1.000.

Velten, Walter: *See—*
Goehle, Rolf; Velten, Walter; and Knirsch, Gunther, 3,789,334.

Verboven, Ghislain Felix Alfons Arthur: *See—*
Schenkels, Ferdinand Jose Maria; and Verboven, Ghislain Felix Alfons Arthur, 3,788,724.

Vercillo, Peter A., to Continental Can Company, Inc. Closures with corrosion halting means. 3,788,508, Cl. 215-40.000.

Veres, Frank: *See—*
Austin, Lewis M.; Denman, Robert R.; O'Donnell, Thomas P.; and Veres, Frank, 3,788,828.

Verner, Dalton R., to Colt Industries Operating Corporation. Apparatus for electrical discharge machining employing periodic extended pulse off time. 3,789,182, Cl. 219-69.00c.

Verth, Joachim Zur: *See—*
Verth, Joachim Zur; and Prymelski, Franz, 3,788,870.

Verth, Joachim Zur; and Prymelski, Franz, to Verth, Joachim Zur. Xylolith building boards and sheets. 3,788,870, Cl. 106-108.000.

Vickland, Jack M., to Philco-Ford Corporation. Apparatus for wrapping cables or the like and a rotatable antenna utilizing the same. 3,789,415, Cl. 343-763.000.

Victor Company of Japan, Limited: *See—*
Negishi, Kazuo, 3,789,139.

Victor Complometer Corporation: *See—*
Hale, James C., 3,788,298.

Victor Comptometer Corporation: *See—*
Bear, Fred B.; and Jefferey, Owen E., 3,787,984.

Victoria Industries, Ltd.: *See—*
Cameron, Clyde Fraser, 3,788,604.

Vilagi, Burton J.; and Stumphauzer, William C., to Nordson Corporation. Apparatus for emplacing seals to closures for containers. 3,788,561, Cl. 239-553.500.

Vincent, Marcel, to Coleman Company, Inc., The. Snowmobile suspension system. 3,788,412, Cl. 180-5.00r.

Vjecsner, Paul. Envelope lock. 3,788,539, Cl. 229-77.000.

Vogel, Norbert G., Jr.: *See—*
Heller, Lawrence G.; and Vogel, Norbert G., Jr., 3,789,312.

Vogel, Ralph A. Vertical melting furnace. 3,788,623, Cl. 266-33.00r.

Vogler, Willy: *See—*
Frick, Heinrich; Halder, Niklaus; and Vogler, Willy, 3,789,086.

Volgstadt, Frank R.; and Scmancik, John R., to Diamond Shamrock Corporation. Regulation of the viscosity increase in chemically thickened unsaturated polyester formulations. 3,789,030, Cl. 260-29.6nr.

Vollhardt, Dietrich, to U.S. Philips Corporation. Circuit arrangement for rhythmic, intermittent operation of separate magnets. 3,789,272, Cl. 317-137.000.

Volpe, Richard L., to Rockwell International Corporation. Loom reed motion. 3,788,359, Cl. 139-26.000.

Von der Pfordten, Hans J. Method for growing monocultures. 3,788,951, Cl. 195-120.000.

Von Duprin, Inc.: *See—*
Zawadzki, George Z., 3,788,687.

Von Grunberg, Hubertus; Fink, Werner; and Kircher, Dieter, to ITT Industries, Inc. Antiskid control system. 3,788,710, Cl. 303-21.00f.

Vons, Leonard Hendrik: *See—*
Piepers, Gijsbrecht Gerhardus; Vons, Leonard Hendrik; van der Linde, Aart; and Ljbrink, Eduard, 3,789,184.

Voss, Herman. Materials handling scoop. 3,788,507, Cl. 214-620.000.

Vulcan Australia Limited: *See—*
Trihey, John Massey, 3,788,121.

Wada, Moriyasu: *See—*
Sawano, Takahiro; Kabota, Katuhiko; Ando, Masaru; Wada, Moriyasu; Murayama, Tohru; and Ozawa, Tadayuki, 3,789,275.

Wagers, William O.: *See—*
Frappier, Robert H.; Tanner, Hal W., Jr.; and Wagers, William O., 3,788,920.

Wagner, Donald M., to General Electric Company. Photographic lighting unit. 3,789,212, Cl. 240-52.00r.

Wagner, John R.: *See—*
Kirschstein, Werner P.; and Wagner, John R., 3,788,125.

Wagner, Robert F.; Kubiak, Edward J.; and Rollo, Edward J., Jr., to General American Transportation Corporation. Toilet and waste storage system. 3,787,901, Cl. 4-10.000.

Wakeman, Alfred W.; and Manierre, Robert L., to Audio Devices, Inc. Endless tape cartridge. 3,788,574, Cl. 242-55.19a.

Walden, Noel Harry Fred: *See—*
Knight, Lindsay Charles; Finch, Colin Maxwell; Walden, Noel Harry Fred; and Racz, George, 3,788,748.

Walden, Robert Henry: *See—*
Krambeck, Robert Harold; and Walden, Robert Henry, 3,789,267.

Waldron, Richard A.; and Stern, Ernest, said Stern assor. to Massachusetts Institute of Technology. Micro-acoustic waveguide. 3,789,327, Cl. 333-30.00r.

Walker, Charles F. Writing facilitating glove. 3,787,898, Cl. 2-163.000.

Walker, Darrell W., to Phillips Petroleum Company. Oxidative dehydrogenation catalysts. 3,789,017, Cl. 252-437.000.

Walker, David D.: *See—*
Benjamin, Milton L.; Walker, David D.; and Miles, Wilbur N., 3,788,658.

Walker, Donald F.: *See—*
Dalena, Rudolph; Onishi, Roy K.; and Walker, Donald F., 3,789,403.

Walker, Peter Albert; and Humpoletz, Justus Ernest, to International Computers Limited. Deposited strip heads. 3,789,158, Cl. 179-100.20c.

Wallace-Murray Corporation: *See—*
Tyler, Robert P., 3,788,182.

Ward, Bennie Ray, Jr.: *See—*
Singleton, Ogle R., Jr.; and Ward, Bennie Ray, Jr., 3,788,824.

Ward, John Joseph Bernard: *See—*
Christie, Ian Robert Arthur; and Ward, John Joseph Bernard, 3,788,957.

Wareing, Kenneth. Flasher switch with outage indication. 3,789,232, Cl. 307-10.01s.

Warlick, William W., Jr.: *See—*
Burkness, Donald C.; and Warlick, William W., Jr., 3,789,390.

Warnecke, Robert Jean: *See—*
Kervizic, Jacques; Masic, Rene; Shroff, Arvind; and Warnecke, Robert Jean, 3,789,253.

Warner & Swasey Company, The: *See—*
Novkov, Raymond E., 3,787,941.

Warner-Lambert Company: *See—*
Ercoli, Alberto; and Gardi, Rinaldo, 3,789,121.

Wartes, Richard M. Multifunctional pegged furniture. 3,788,700, Cl. 297-442.000.

Washabaugh, Edward Peter, Jr.: *See—*
Washabaugh, William E.; and Washabaugh, Edward Peter, Jr., 3,788,080.

Washabaugh, William E.; and Washabaugh, Edward Peter, Jr. Method of constructing concrete manholes having sealed joints with pipes connected thereto. 3,788,080, Cl. 61-2.000.

Wasson, Daniel Aaron: *See—*
Udy, Lex Lynn; Jessop, Harvey Allred; and Wasson, Daniel Aaron, 3,788,909.

Watanabe, Mike Fukuichi. Outrigger line release. 3,787,995, Cl. 43-43.120.

Watanabe, Teruji; Fukui, Takasuke; and Suzuki, Shizuo, to Kokusai Denshin Denwa Kabushiki Kaisha. Magnetic sensor using a parametrically excited second harmonic oscillator. 3,789,234, Cl. 307-88.00p.

Waters, Elmer Dale, to McDonnell Douglas Corporation. Permafrost structural support with heat pipe stabilization. 3,788,389, Cl. 165-45.000.

Watson, Donald W.: *See—*
Polit, Neil A.; Snowdon, Donald R.; and Watson, Donald W., 3,788,921.

Watson, Robert Ian: *See—*
Tusch, Nicholas Norbert; Watson, Robert Ian; and Taylor, Jack, 3,788,273.

Waysman, Simon S., to Koor Chemicals Ltd. Road marking. 3,788,879, Cl. 117-68.500.

Wean United, Inc.: *See—*
Adair, James R., 3,788,181.
Shumaker, Charles Storer, 3,788,534.

Webb, Wells A.; and Baker, Freling E. Car loading method and apparatus. 3,788,496, Cl. 214-6.00c.

Weber, Bernard R.; and Wendt, David W., to Wesbar Corporation. Vehicle lamp. 3,789,209, Cl. 240-7.10r.

Weber, Carl; Shroyer, Larry L.; and Baker, James T., to Progressive Dynamics, Inc. Recessed lighted assist bar. 3,789,210, Cl. 240-7.300.

Weber, Karl-Arnold: *See—*
Traubel, Harro; Weber, Karl-Arnold; Koch, Otto; and Konig, Klaus, 3,788,887.

Weber, Rudolf; and Upgenoorth, Angelika, to Henkel & Cie G.m.b.H. Solid, pulverulent to granular compositions containing bleaching activators. 3,789,002, Cl. 252-99.000.

Weber, Willi: *See—*
Schaumann, Anton; and Weber, Willi, 3,789,394.

Wegmiller, Gary R.: *See—*
Sarageno, Ignatius B.; and Wegmiller, Gary R., 3,788,334.

Wehl, Glenn E., to Portage Electric Products, Inc. Thermostatic switch. 3,789,339, Cl. 337-95.000.

Weigert, Wolfgang Deutsche Gold- und Silber-Scheideanstalt vormals Roessler: *See—*
Giesselmann, Gunter; Schreyer, Gerd; and Weigert, Wolfgang Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, 3,789,114.

Weimer, Paul Kkssler, to RCA Corporation. Bucket brigade scanning of sensor array. 3,789,240, Cl. 307-223.00c.

Weise, Lutz: *See—*
Klatt, Alfred; Isernhagen, Fritz; Weise, Lutz; and Reinecke, Erich, 3,788,592.

Weisinger, Martin Donald, to General Dynamics Corporation. Method of manufacturing boron-aluminum composite tubes. 3,788,926, Cl. 156-286.000.

Weiss, George. Front placket for female's blouse. 3,787,896, Cl. 2-106.000.

Weiss, Steven M.: *See—*
Batdorf, Jack B.; and Weiss, Steven M., 3,788,869.

Weisz, William, to Singer Company, The. Sewing machine having a plurality of intelligence record systems associated therewith. 3,788,249, Cl. 112-158.00r.

Welk, Horace B., Jr., to Casco Products Corporation. Fluidic driver alertness system. 3,788,357, Cl. 137-805.000.

Wellman, Russel E.; and Crystal, Richard G., to Xerox Corporation. Pressure fixable electrostatagraphic toner. 3,788,994, Cl. 252-62.100.

Wells, Ronald L., to Ethyl Corporation. Brazed foamed metal. 3,788,823, Cl. 29-197.000.

Welty, Albert B., Jr.: *See—*
Bearden, Roby, Jr.; MacMullin, Robert B.; Lewis, William E.; and Welty, Albert B., Jr., 3,788,978.

Weman, Per Olof, to Klippan GmbH. Inflatable air bag for motor vehicles for attenuating the impact effect of the passenger in case of accident. 3,788,663, Cl. 280-150.0ab.

Wendt, David W.: *See—*
Weber, Bernard R.; and Wendt, David W., 3,789,209.

Wenger, Wolfgang: *See—*
Greiner, Joachim; Engelsmann, Dieter; Gersch, Josef; Landbrecht, Franz; Muller, Rudolf; Wenger, Wolfgang; and Wiedemann, Otto, 3,789,157.

Wenzel, Werner; and Chaussy, Leon-Michel, to Rheinische Braunkohlenwerke AG. Method of removing vaporized lead from gases after contact with liquid lead. 3,788,838, Cl. 75-77.000.

Werneke, Michael Francis, to American Cyanamid Company. Flotation process for recovering molybdenum. 3,788,467, Cl. 209-167.000.

Wernli, Hans, to Siemens-Albis Aktiengesellschaft. Apparatus for simultaneously transmitting and receiving as well as mixing transmitted and received waves. 3,789,406, Cl. 343-100.00r.

Wesbar Corporation: *See—*
Weber, Bernard R.; and Wendt, David W., 3,789,209.

West, Benjamin W., to California Controls Company. Block and vent valve. 3,788,350, Cl. 137-596.180.

West, James I., Jr., to Charter Enterprises, Inc. Protective barrier. 3,788,086, Cl. 61-41.00a.

West Virginia Armature Company: *See—*
De Brick, Eric, 3,789,346.

Westacott, Harry L.: *See—*
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Westberg, Johan Eric Hayden: *See—*
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Western Electric Company, Incorporated: *See—*
Balchunas, William Clement; and Mila, Jose Antonio, 3,789,295.
Brown, William B.; Besnyo, George Frank; and Hornor, Eugene Marshall, 3,788,213.
Garrett, Carl Eugene; Kinsley, William Henry, Jr.; and Moody, Larry Dean, 3,789,099.

Western States Envelope Company: *See—*
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Westinghouse Air Brake Company: *See—*
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Westinghouse Bremsen- und Apparatebau GmbH: *See—*
Klatt, Alfred; Isernhagen, Fritz; Weise, Lutz; and Reinecke, Erich, 3,788,592.

Westinghouse Canada Limited: *See—*
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Westinghouse Electric Corporation: *See—*
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Bell, Heinz G.; and Stepper, Heinz J., 3,789,255.
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Westvaco Corporation: *See—*
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Falkehag, Sten I.; and Braddon, David V., 3,789,043.
Falkehag, Sten, II; and Bailey, Carl W., III, 3,788,808.

Wheelabrator-Frye Inc.: *See—*
Fox, Everett D.; Schaefer, John P.; and Leliaert, Raymond M., 3,788,427.

Wheelock, George L., to Goodrich, B. F., Company, The. Impregnating nonwovens with an alkyl acrylate polymer-carboxylic polymer latex. 3,788,878, Cl. 117-62.200.

Whirlpool Corporation: *See—*
Domer, John T., 3,788,300.

White, Richard M.: *See—*

Rostler, Fritz S.; White, Richard M.; and Newton, Jack W., 3,788,883.

White, Robert A.: *See—*
Fusco, Ralph L.; and White, Robert A., 3,788,218.

White, Robert P.: *See—*
Meier, Carl H.; and White, Robert P., 3,789,195.

White, Robert W.: *See—*
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Whited, D. E., to Shell Oil Company. Tape staging bins for data center. 3,788,719, Cl. 312-198.000.

Whittaker Corporation: *See—*
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Wiechert, Rudolf; and Neumann, Friedmund, to Schering AG. 4,6-Dichlor-Δ4,6-steroids and method of making and using the same. 3,789,087, Cl. 260-397.300.

Wiedemann, Otto: *See—*
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Wieland, Walter, to Langen & Company. Hydraulic reservoir. 3,788,627, Cl. 267-64.000.

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Wierzbicki, Julian J.: *See—*
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Wiessner, Willi, to Leitz, Ernst, G.m.b.H. Viewfinder for single lens reflex cameras. 3,788,202, Cl. 95-11.00v.

Wilander, Roger R. D. Ground level loading trailer. 3,788,675, Cl. 280-43.110.

Wilborn, Wolfgang: *See—*
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Wilder, Thomas C.: *See—*
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Wilk, Harold G.: *See—*
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De Cat, Arthur Henri; Sels, Francis Jeanne; Pollet, Robert Joseph; and Willems, Jozef Frans, 3,788,850.

Willems, Jozef Frans; Sels, Francis Jeanne; Pollet, Robert Joseph; and De Cat, Arthur Henri, to Agfa-Gevaert N.V. Surface-active compounds used as coating aids in film-forming compositions. 3,788,851, Cl. 96-67.000.

Williams, Fred: *See—*
Yackiw, Charles; and Williams, Fred, 3,788,008.

Williams, Thurston V.; and Cheever, Leo H., to O.K. Tool Company, The. Controlled tool for machining compound surfaces. 3,788,009, Cl. 51-5.000.

Williamson, Kenneth D.: *See—*
Caflisch, Edward G.; Reed, Denvil E., Jr.; and Williamson, Kenneth D., 3,788,979.

Williamson, Robert W. Forming tool and fixture therefor. 3,788,177, Cl. 83-454.000.

Willinger, Allan H.; and Dinnerstein, Albert J., to Metaframe Corporation. Animal exerciser and activity device. 3,788,277, Cl. 119-29.000.

Willis, Floyd H., 20% to Lee, Raymond, Organization, Inc., The. Exhaust device for automotive vehicles. 3,788,417, Cl. 180-64.00a.

Willis, Wesley Nelson: *See—*
Lenaeris, George Victor; Laing, Graham Sterling; Morrell, Ronald Joseph; and Willis, Wesley Nelson, 3,789,348.

Wilner, Leslie B., to Becton, Dickinson Electronics Company. Low cost resistance gauge accelerometer. 3,788,149, Cl. 73-517.00r.

Wilson, Billy Fred, to Dresser Industries, Inc. Mud cake compensated neutron logging system. 3,789,219, Cl. 250-264.000.

Wilson, Calvin L., to Reynolds Metals Company. Method of making article-supporting wall for cooking pan. 3,787,955, Cl. 29-432.200.

Wilson, David G.; and Smith, Ora E., to Massachusetts Institute of Technology. Impact sensor and coder apparatus. 3,788,466, Cl. 209-79.000.

Wilson, John C.: *See—*
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Wilson, Raymond F.: *See—*
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Wilson, Robert J., to General Motors Corporation. Firing circuit. 3,788,228, Cl. 106-70.20r.

Windish, Thomas J.: *See—*
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Winstead, Thomas W. Continuous method of manufacturing articles from foamed thermoplastic material. 3,789,095, Cl. 264-51.000.

Winter, Peter, to Brown, Boveri & Company Limited. Static converter arrangement. 3,789,233, Cl. 307-17.000.

Winterberg, Felix: *See—*
Silbereisen, Hermann; Winterberg, Felix; and Ginzel, Severin, 3,788,787.

Winters, William C.: *See—*
Durst, Jack R.; and Winters, William C., 3,788,861.

Wisconsin Alumni Research Foundation: *See—*
Goering, Harlan L.; Eikenberry, John N.; and Koermer, Gerald S., 3,789,060.

Wise, Eugene H., to Sloane, R. & G., Manufacturing Company, Inc. Method of forming a lap joint between tubular articles of thermoplastic material. 3,788,928, Cl. 156-294.000.

Wismer, Marco; and Prucnal, Paul J., to PPG Industries, Inc. Aziridinediisocyanate adduct modified compositions. 3,789,034, Cl. 260-77.5am.

Wittenbach, Gerald R.: *See—*
Kropscott, Earle L.; and Wittenbach, Gerald R., 3,789,100.

Wolfe, Robert N.: *See—*
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Wolfrum, Gerhard: *See—*
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Wolk, Ronald H.; Chervenak, Michael C.; and Alpert, Seymour B., to Hydrocarbon Research, Inc. High conversion hydrogenation. 3,788,973, Cl. 208-59.000.

Wolverine Industries, Inc.: *See—*
Teggelaar, Claude; and De Bruyn, William T., 3,788,006.

Wong, Philip Chock-Yueh: *See—*
Dumstorff, Eugene Francis; Iverson, John Howard; Schloss, Phillip Christian; and Wong, Philip Chock-Yueh, 3,789,367.

Wood, Charles: *See—*
Schottmiller, John Charles; and Wood, Charles, 3,788,889.

Wood, Derek John, to Imperial Chemical Industries, Limited. Valve. 3,788,355, Cl. 137-625.110.

Wood Industries, Inc.: *See—*
Fusco, Ralph L.; and White, Robert A., 3,788,218.

Woodward, John W.: *See—*
Jacobs, Melvin A.; and Woodward, John W., 3,789,150.

Work Right Products, Inc.: *See—*
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Worrix, Matthew L.: *See—*
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Wrenner, Warren R.: *See—*
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Wright, Barry, Corporation: *See—*
Hotz, Kenneth J., Jr.; Steiner, Edward; and Fox, Gary L., 3,788,628.

Wright, Lawrence W.; Tolleson, Leon H.; Abrahamson, Daniel P.; Thomas, Paul M.; and Crile, Eugene E., to Thomas 1970 Trust, The, mesne. Panel manufacturing machine and method. 3,789,101, Cl. 264-261.000.

Wroblewski, Henry A.: *See—*
Klebe, Johann F.; and Wroblewski, Henry A., 3,789,055.

Wroblewski, Richard J., to Eastman Kodak Company. Strip take-up threading device. 3,788,572, Cl. 242-210.000.

Wu, Tao-Yuan, to Ford Motor Company. Unitized distributor vacuum spark advance control valve with regulator. 3,788,291, Cl. 123-117.00a.

Wu, Te-Hsiung. Voltage regulating device for vehicles. 3,789,287, Cl. 320-48.000.

Wyzsza Szkola Inzynierska: *See—*
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Xerox Corporation: *See—*
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Yabagida, Yoshio: *See—*
Shimazaki, Toshio; Tamei, Fumio; and Yabagida, Yoshio, 3,788,751.

Yackiw, Charles; and Williams, Fred, to Schlegel Manufacturing Company, The. Belt line weather seal. 3,788,008, Cl. 49-496.000.

Yamada, Masatora, to Mitsubishi Petrochemical Company, Limited. Disposing device for synthetic resin waste. 3,788,567, Cl. 241-247.000.

Yamaga, Eiichi: *See—*
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Yamaguchi, Michio: *See—*
Usui, Keizauburo; and Yamaguchi, Michio, 3,788,669.

Yamakawa, Choji: *See—*
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Yamamoto Electric Industrial Co., Ltd.: *See—*
Soeda, Katsuji, 3,788,250.

Yamamoto, Hiroshi, to Kabushiki Kaisha Synapse, President Hiroshi Yamamoto. Wiring system for group testing apparatus. 3,789,270, Cl. 317-99.000.

Yamamoto, Masayuki; Kobayashi, Kazuo; and Ohashi, Youitu, to Hitachi, Ltd. Semiconductor device and method of producing the same. 3,788,905, Cl. 148-187.000.

Yamamoto, Sadao: *See—*
Sato, Wasuke; Iriko, Fumio; Yamamoto, Sadao; Fujisawa, Mitsumaro; and Hatakeyama, Shigeyuki, 3,788,199.

Yamanaka, Masami, to Yamata Scale Company, Limited. Counting balance. 3,789,202, Cl. 235-151.330.

Yamata Scale Company, Limited: *See—*
Yamanaka, Masami, 3,789,202.

Yamazaki, Eiichi; Maruyama, Koichi; and Ueda, Toshio, to Hitachi, Ltd. Exposure device for manufacturing colour picture tubes. 3,788,200, Cl. 95-1.000.

Yamazaki, Eiichi; and Kanai, Hiromi, to Hitachi, Ltd. Post-deflection focusing type colour cathode ray tube. 3,789,254, Cl. 313-85.00s.

Yamazaki, Tatsuya; and Morishita, Yasumatsu, to Ryobi, Ltd. Spinning reel for fishing. 3,788,570, Cl. 242-84.21r.

Yancey, John W.: *See—*
Clancy, Lawrence F.; Lee, Emil B., Jr.; Smart, William O.; and Yancey, John W., 3,788,418.

Yannopoulos, Lymperios N.; and Pebler, Alfred R., to Westinghouse Electric Corporation. Method of dosing an incandescent lamp with a controlled amount of halogen-containing material. 3,788,725, Cl. 316-20.000.

Yarnell, Charles Frederick, to Bell Telephone Laboratories, Incorporated. Fabrication of negative electrodes in lead-acid batteries. 3,788,898, Cl. 136-27.000.

Yazvac, Thomas A., to Square D Company. Handle interlock arrangement for a pair of electric circuit breakers. 3,789,169, Cl. 200-50.00c.

Yin, Robert I.: *See—*
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York, Donald W., to Clark Equipment Company. Seat safety brake control system. 3,788,431, Cl. 188-109.000.

Yoshida, Isao; Tokuyama, Takashi; Nishimatsu, Shigeru; and Ikeda, Takahide, to Hitachi, Ltd. Insulated gate field effect transistors and method of producing the same. 3,787,962, Cl. 29-571.000.

Yoshida, Mikihiko: *See—*
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Yoshii, Tadashi: *See—*
Matsumura, Shiro; Shin, Hiroshi; Sugano, Junichiro; Yoshii, Tadashi; Kuriyama, Yasuhisa; and Komaki, Takeshi, 3,789,115.

Youmans, Arthur H., to Dresser Industries, Inc. Water production system having means to selectively profile vary borehole fluid flow. 3,789,217, Cl. 250-265.000.

Young, David W., to Elco Chemicals Inc. Composition for maintaining the integrity of aqueous media. 3,789,008, Cl. 252-180.000.

Yu, Hwa Nien: *See—*
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Yuen, Kin Sun: *See—*
Yuen, Yat Chuen; and Yuen, Kin Sun, 3,788,042.

Yuen, Yat Chuen; and Yuen, Kin Sun. Gas-liquid contacting apparatus. 3,788,042, Cl. 55-227.000.

Yuken Kogyo Company, Ltd.: *See—*
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Zahner, John C., to Mobil Oil Corporation. Process for separating uranium isotopes. 3,788,038, Cl. 55-17.000.

Zaiden Hojin Handotai Kenkyu Shinkokai: *See—*
Nashizawa, Junichi, 3,789,317.

Zankl, Erich: *See—*
Hagemann, Hermann; Pedain, Josef; and Zankl, Erich, 3,789,033.

Zankl, Helga: *See—*
Hagemann, Hermann; Pedain, Josef; and Zankl, Erich, 3,789,033.

Zankl, Walter: *See—*
Hagemann, Hermann; Pedain, Josef; and Zankl, Erich, 3,789,033.

Zaromb, Solomon. Electrochemical power generation apparatus and methods. 3,788,899, Cl. 136-86.00a.

Zawadzki, George Z., to Von Duprin, Inc. Safety exit latch bolt retainer. 3,788,687, Cl. 292-92.000.

Zeilman, Mary C. Safety security vest. 3,788,309, Cl. 128-134.000.

Zeiser, Donald K. Precision electronic tuning device. 3,788,184, Cl. 84-454.000.

Zeitlin, Edward J. Pressure operated modulating meter for regulating a flue damper. 3,788,795, Cl. 431-13.000.

Zell, Michael N.: *See—*
Towne, Delbert D.; and Zell, Michael N., 3,789,286.

Zellweger Ltd.: *See—*
Heusser, Eduard, 3,788,138.

Zenith Radio Corporation: *See—*
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Zens, John F.: *See—*
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Zimmer Aktiengesellschaft: *See—*
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Zimmerman, D. W., Mfg., Inc.: *See—*
Stone, Charles W., 3,788,491.

Zimmermann, Max: *See—*
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Zimmern, Bernard. Globoid worm fluid-flow machines. 3,788,784, Cl. 418-153.000.

Zinser-Tertilmaschinen Gesellschaft mit beschrankter Haftung: *See—*
Haussman, Gerhard; and Schulz, Gunter, 3,788,054.

Zipp, Otmar: *See—*
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Zollinger, Alfred: *See—*
Geng, Peter; Gueniat, Robert; Zollinger, Alfred; Luscher, Walter; Schawalder, Hansjorg; and Tschanen, Hanspeter, 3,788,368.

Zsoldos, Frank J., Jr.; and Kowalski, Anna. Color control of water that is recirculated. 3,788,982, Cl. 210-24.000.

Zuest, Max. Anchor for attaching dental partial or full artificial denture. 3,787,975, Cl. 32-5.000.

Zundorf, Dieter: *See—*
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Zuppiger, Paul: *See—*
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2C-2B Corporation: *See—*
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# LIST OF REISSUE PATENTEES

TO WHOM

## PATENTS WERE ISSUED ON THE 29TH DAY OF JANUARY, 1974

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and of the original registrations.

Eckerle, Otto. Wear (and tear-) compensating high-pressure gear pump. Re. 27,901, 1–29–74, Cl. 418—71.

Eckerle, Otto. Wear (and tear-) compensating high-pressure gear pump. Re. 27904, 1–29–74, Cl. 418—71.

Estelle, Weems E., H. Rangel, and P. M. Petrucci, to General Science Corp. Particle counting system. Re. 27,902, 1–29–74, Cl. 235—92.

Fluidtech Corp.: *See*—
Osheroff, Gene W. Re. 27,907.

Fogarty, Charles P. Space delivery system. Re. 27,903, 1–29–74, Cl. 244—1.

General Science Corp.: *See*—
Estelle, Weems E., Rangel, and Petrucci. Re. 27,902.

Midland-Rose Corp.: *See*—
Whiteman, Donald R. Re. 27,905.

Nutter, Dale E.: *See*—
Nutter, Irvin E., and D. E. Re. 27,908.

Nutter, Irvin E., deceased, by the First National Bank and Trust Co., executor, and D. E. Nutter, 30% to M. C. Nutter, 20% to N. N. Pantaleoni. Fluid contact tray. Re. 27,908, 1–29–74, Cl. 261—114.

Osheroff, Gene W., to Fluidtech Corp. Apparatus for air condition systems. Re. 27, 907, 1–29–74, Cl. 165—22.

Petrucci, Pasquale M.: *See*—
Estelle, Weems E., Rangel, and Petrucci. Re. 27,902.

Nutter, Martha C.: *See*—
Nutter, Irvin E., D. E., and Pantaleoni. Re. 27,908.

Rangel, Henry: *See*—
Estelle, Weems E., Rangel, and Petrucci. Re. 27,902.

Toepper, George G., to Universal Oil Products Co. Reinforced flexible connector. Re. 27,906, 1–29–74, Cl. 285—55.

Universal Oil Products Co.: *See*—
Toepper, George G. Re. 27,906.

Whiteman, Donald R., to Midland-Ross Corp. Grappler-spreader for cantilever-boom trucks. Re. 27,905, 1–29–74, Cl. 214—147.

# LIST OF PLANT PATENTEES

Armstrong, David L., to Armstrong Nurseries, Inc. Rose plant. 3,457, 1–29–74, Cl. 28.

Armstrong Nurseries, Inc.: *See*—
Armstrong, David L. 3,457.

Duffett, William E.: *See*—
Holmquist, Philip W., Jessel, and Duffett. 3,459.
Mack, Grace H., Jessel, and Duffett. 3,454.
Mack, Grace H., Jessel, and Duffett. 3,460.
Jessel, Walter H., Jr., and Duffett. 3,458.

Granny Spur Enterprises: *See*—
Hannaford, John G. 3,453.

Hall, G. B.: *See*—
Machin, Barrie J., and Hall. 3,455.

Hannaford, John G., to Granny Spur Enterprises. Apple tree. 3,453, 1–20–74, Cl. 34.

Holmquist, Philip W., W. H. Jessel, Jr., and W. E. Duffett, said Jessel and said Duffett assor. to said Holmquist. Chrysanthemum plant. 3,459, 1–29–74, Cl. 74.

Jessel, Walter H., Jr.: *See*—
Mack, Grace H., Jessel, and Duffett. 3,454.
Holmquist, Philip W., Jessel, and Duffett. 3,459.
Mack, Grace H., Jessel, and Duffett. 3,460.

Jessel, Walter H., Jr., and W. E. Duffett, to Yoder Brothers, Inc. Chrysanthemum plant. 3,458, 1–29–74, Cl. 78.

Larus, Charles T.: *See*—
Larus, John R. and C. T. 3,461.

Larus, John R., and C. T. Larus, to Selected Glads, Inc. New and distinct variety of gladiolus. 3,461, 1–29–74, Cl. 85.

Machin, Barrie J., and G. B. Hall, to Yoder Brothers, Inc. Chrysanthemum plant. 3,455, 1–29–74, Cl. 74.

Mack, Grace H., W. H. Jessel, Jr., and W. E. Duffett, said Jessel and said Duffett assors. to Grace H. Mack. Chrysanthemum plant. 3,454, 1–29–74, Cl. 75.

Mack, Grace H., W. H. Jessel, Jr., and W. E. Duffett, said Jessel and said Duffett assors. to said Mack. Chrysanthemum plant. 3,460, 1–29–74, Cl. 75.

San Gabriel Nursery and Florist: *See*—
Yoshimure, Raymond. 3,462.

Selected Glads, Inc.: *See*—
Larus, John R., and C. T. 3,461.

Whitmore, Harold B. Rhubarb plant. 3,456, 1–29–73, Cl. 89.

Yoder Brothers, Inc.: *See*—
Machin, Barrie J. and Hall. 3,455.
Jessel, Walter H., Jr., and Duffett. 3,458.

Yoshimura, Raymond, to San Gabriel Nursery and Florist. Azalea plant. 3,462, 1–29–74, Cl. 57.

# LIST OF DESIGN PATENTEES

Anchor Hocking Corp.: *See*—
Schaefer, Howard A. 230,208.
Schaefer, Howard A. 230,209.

Anderson, Lon R., to Monadnock Lifetime Products, Inc. Police club. 230,150, 1–29–74, Cl. D22—1.

Aneshansley, James T.: *See*—
Flieder, Robert A., and Aneshansley. 230,197.

Banner, Joseph P. Weeder. 230,127, 1–29–74, Cl. D8—11.

Barris, George, to Zee Toys, Inc. Toy model car. 230,178, 1–29–74, Cl. D34—15.

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| | 3,787,918 |
| 105 | 3,787,921 |
| 244CH | 3,787,919 |
| 416 | 3,787,920 |

**CLASS 16**

| | |
|---|---|
| 1 | 3,787,922 |
| 49 | 3,787,924 |
| 107 | 3,787,925 |
| 184 | 3,787,923 |

**CLASS 17**

| | |
|---|---|
| 11R | 3,787,926 |
| 64 | 3,787,927 |
| 71 | 3,787,928 |

**CLASS 19**

| | |
|---|---|
| 83 | 3,787,929 |
| 106R | 3,787,930 |
| 129R | 3,787,931 |
| 161P | 3,787,932 |
| 267 | 3,787,933 |

**CLASS 23**

| | |
|---|---|
| 230B | 3,788,812 |
| 232E | 3,788,813 |
| 232R | 3,788,814 |
| 253R | 3,788,815 |
| | 3,788,816 |
| 259.2 | 3,788,817 |
| 300 | 3,788,818 |
| | 3,788,819 |

**CLASS 24**

| | |
|---|---|
| 85R | 3,787,934 |
| 113MP | 3,787,935 |
| 262R | 3,787,936 |

**CLASS 28**

| | |
|---|---|
| 44 | 3,787,938 |

**CLASS 29**

| | |
|---|---|
| 25.11 | 3,787,939 |
| 25.13 | 3,787,937 |
| 25.16 | 3,787,940 |
| 96 | 3,787,941 |
| 105A | 3,788,625 |
| 125 | 3,787,942 |
| | 3,787,943 |
| 157.3R | 3,787,944 |
| 157.4 | 3,787,945 |
| 187 | 3,788,820 |
| 195.5 | 3,788,821 |
| 196.1 | 3,788,822 |
| 197 | 3,788,823 |
| 197.5 | 3,788,824 |
| 200D | 3,787,946 |
| 203D | 3,787,949 |
| 203H | 3,787,948 |
| 208C | 3,787,947 |
| 237 | 3,787,950 |
| | 3,787,951 |
| 408 | 3,787,952 |
| 427 | 3,787,953 |
| 430 | 3,787,954 |
| 432.2 | 3,787,955 |
| 451 | 3,787,956 |
| 452 | 3,787,957 |
| 472.3 | 3,787,958 |
| 477 | 3,787,960 |
| 482 | 3,787,959 |
| 570 | 3,787,961 |
| 571 | 3,787,962 |
| 603 | 3,787,963 |
| | 3,787,964 |
| 620 | 3,787,965 |
| 628 | 3,787,966 |

**CLASS 30**

| | |
|---|---|
| 4R | 3,787,967 |
| 124 | 3,787,968 |
| 140 | 3,787,969 |
| 272R | 3,787,970 |
| 293 | 3,787,971 |
| 317 | 3,787,972 |
| 391 | 3,787,973 |

**CLASS 32**

| | |
|---|---|
| 3 | 3,787,974 |
| 5 | 3,787,975 |
| 14A | 3,787,976 |
| 27 | 3,787,977 |
| 33 | 3,787,978 |
| 71 | 3,787,979 |

**CLASS 33**

| | |
|---|---|
| 27B | 3,787,980 |
| 133 | 3,787,981 |
| 166 | 3,787,982 |
| 174Q | 3,787,983 |
| 265 | 3,787,984 |

**CLASS 34**

| | |
|---|---|
| 45 | 3,787,985 |
| 229 | 3,787,986 |

**CLASS 35**

| | |
|---|---|
| 1 | 3,787,987 |
| 10.4 | 3,789,128 |
| 31R | 3,787,988 |

**CLASS 37**

| | |
|---|---|
| 90 | 3,787,989 |

**CLASS 40**

| | |
|---|---|
| 86R | 3,787,990 |
| 106.52 | 3,787,991 |
| 152 | 3,787,992 |
| 306 | 3,787,993 |

**CLASS 43**

| | |
|---|---|
| 15 | 3,787,994 |
| 43.12 | 3,787,995 |

**CLASS 46**

| | |
|---|---|
| 25 | 3,787,996 |
| 78 | 3,787,997 |
| 79 | 3,787,998 |
| 110 | 3,787,999 |
| 205 | 3,788,000 |

**CLASS 47**

| | |
|---|---|
| 33 | 3,788,001 |
| 34.13 | 3,788,002 |
| 56 | 3,788,003 |

**CLASS 48**

| | |
|---|---|
| 190 | 3,788,825 |

**CLASS 49**

| | |
|---|---|
| 41 | 3,788,004 |
| 103 | 3,788,005 |
| 417 | 3,788,006 |
| 449 | 3,788,007 |
| 496 | 3,788,008 |

**CLASS 51**

| | |
|---|---|
| 5 | 3,788,009 |
| 9 | 3,788,010 |
| 170R | 3,788,011 |

**CLASS 52**

| | |
|---|---|
| 1 | 3,788,013 |
| 18 | 3,788,014 |
| 66 | 3,788,016 |
| 73 | 3,788,012 |
| 80 | 3,788,015 |
| 122 | 3,788,017 |
| 127 | 3,788,026 |
| 185 | 3,788,018 |
| 212 | 3,788,019 |
| 309 | 3,788,020 |
| 403 | 3,788,021 |
| | 3,788,022 |
| 648 | 3,788,024 |
| 685 | 3,788,025 |
| 741 | 3,788,023 |

**CLASS 53**

| | |
|---|---|
| 24 | 3,788,027 |
| 51 | 3,788,028 |
| 59 | 3,788,029 |
| 123 | 3,788,030 |
| | 3,788,031 |
| 141 | 3,788,032 |
| 186 | 3,788,033 |
| 248 | 3,788,034 |
| 282 | 3,788,035 |

**CLASS 55**

| | |
|---|---|
| 17 | 3,788,038 |
| 25 | 3,788,036 |
| 58 | 3,788,037 |
| 129 | 3,788,041 |
| 160 | 3,788,039 |
| | 3,788,040 |
| 204 | 3,788,044 |
| 227 | 3,788,042 |
| 237 | 3,788,043 |
| 238 | 3,788,045 |
| 341 | 3,788,046 |
| 387 | 3,788,047 |
| 406 | 3,788,048 |

**CLASS 56**

| | |
|---|---|
| 16.9 | 3,788,049 |
| 295 | 3,788,050 |
| 318 | 3,788,051 |
| 341 | 3,788,052 |
| 399 | 3,788,053 |

**CLASS 57**

| | |
|---|---|
| 34R | 3,788,054 |
| 58.72 | 3,788,055 |
| 77.4 | 3,788,057 |
| 77.45 | 3,788,056 |

**CLASS 58**

| | |
|---|---|
| 23BA | 3,788,059 |
| 23R | 3,788,058 |
| 38 | 3,788,060 |
| 50R | 3,788,061 |

**CLASS 59**

| | |
|---|---|
| 35 | 3,788,062 |

**CLASS 60**

| | |
|---|---|
| 19 | 3,788,063 |
| 36 | 3,788,064 |
| 39.02 | 3,788,065 |
| 39.05 | 3,788,066 |
| 39.74B | 3,788,067 |
| 106 | 3,788,068 |
| 207 | 3,788,069 |
| 290 | 3,788,070 |
| 293 | 3,788,071 |
| 324 | 3,788,072 |
| 413 | 3,788,073 |
| | 3,788,074 |
| 424 | 3,788,075 |
| 452 | 3,788,076 |
| 464 | 3,788,077 |
| | 3,788,078 |

**CLASS 61**

| | |
|---|---|
| 1F | 3,788,079 |
| 2 | 3,788,080 |
| 36R | 3,788,081 |
| 41A | 3,788,086 |
| 48 | 3,788,082 |
| 72.1 | 3,788,083 |
| 72.3 | 3,788,084 |
| 72.4 | 3,788,085 |
| 84 | 3,788,087 |

**CLASS 62**

| | |
|---|---|
| 6 | 3,788,088 |
| 55.5 | 3,788,096 |
| 137 | 3,788,089 |
| 139 | 3,788,090 |
| 175 | 3,788,091 |
| | 3,788,092 |
| 200 | 3,788,093 |
| 339 | 3,788,094 |
| 347 | 3,788,095 |

**CLASS 63**

| | |
|---|---|
| 32 | 3,788,097 |

**CLASS 64**

| | |
|---|---|
| 11R | 3,788,098 |
| 12 | 3,788,099 |
| 17A | 3,788,100 |

**CLASS 65**

| | |
|---|---|
| 11W | 3,788,826 |
| 30 | 3,788,827 |
| 33 | 3,788,828 |
| 79 | 3,788,829 |
| 110 | 3,788,830 |
| 111 | 3,788,831 |
| 134 | 3,788,832 |

**CLASS 66**

| | |
|---|---|
| 50A | 3,788,101 |
| 60 | 3,788,102 |
| 65 | 3,788,103 |
| 138 | 3,788,104 |
| 157 | 3,788,105 |

**CLASS 68**

| | |
|---|---|
| 5D | 3,788,106 |

**CLASS 70**

| | |
|---|---|
| 93 | 3,788,107 |
| 233 | 3,788,108 |
| 234 | 3,788,109 |
| 358 | 3,788,110 |
| 364R | 3,788,111 |

**CLASS 72**

| | |
|---|---|
| 46 | 3,788,112 |
| 77 | 3,788,113 |
| 83 | 3,788,114 |
| 181 | 3,788,115 |
| 296 | 3,788,116 |
| | 3,788,117 |
| 324 | 3,788,118 |
| | 3,788,119 |
| 342 | 3,788,120 |
| 381 | 3,788,121 |
| 384 | 3,788,122 |
| 391 | 3,788,123 |

**CLASS 73**

| | |
|---|---|
| 19 | 3,788,124 |
| 32 | 3,788,125 |
| 35 | 3,788,126 |
| 40 | 3,788,127 |
| 73 | 3,788,128 |
| 116 | 3,788,129 |
| 117.4 | 3,788,130 |
| 132 | 3,788,131 |
| 139 | 3,788,132 |
| 141AB | 3,788,134 |
| 141A | 3,788,133 |
| 150A | 3,788,135 |
| 151 | 3,788,136 |
| 159 | 3,788,137 |
| 160 | 3,788,138 |
| 169 | 3,788,139 |
| 194A | 3,788,140 |
| 194B | 3,788,141 |
| 230 | 3,788,142 |
| 346 | 3,788,143 |
| 411 | 3,788,144 |
| 421B | 3,788,145 |
| 432R | 3,788,146 |
| 459 | 3,788,147 |
| 517R | 3,788,149 |

**CLASS 74**

| | |
|---|---|
| 7A | 3,788,151 |
| 7R | 3,788,150 |
| 10.15 | 3,788,152 |
| 68 | 3,788,153 |
| 99 | 3,788,154 |
| 230.01 | 3,788,155 |
| 238 | 3,788,156 |
| 364 | 3,788,157 |
| 412TL | 3,788,158 |
| 422 | 3,788,159 |
| 492 | 3,788,148 |
| 501R | 3,788,160 |
| 516 | 3,788,161 |
| 572 | 3,788,162 |
| 594.6 | 3,788,163 |
| 665T | 3,788,164 |
| 675 | 3,788,165 |
| 710.5 | 3,788,166 |
| 762 | 3,788,167 |

**CLASS 75**

| | |
|---|---|
| .5A | 3,788,833 |
| 1 | 3,788,834 |
| 26 | 3,788,835 |
| 49 | 3,788,836 |
| 55 | 3,788,837 |
| 77 | 3,788,838 |
| 93R | 3,788,839 |
| 94 | 3,788,840 |
| 103 | 3,788,841 |
| 109 | 3,788,842 |
| 124 | 3,788,843 |

**CLASS 81**

| | |
|---|---|
| 3R | 3,788,168 |
| 177UJ | 3,788,169 |

**CLASS 82**

| | |
|---|---|
| 20 | 3,788,170 |

**CLASS 83**

| | |
|---|---|
| 5 | 3,788,171 |
| 9 | 3,788,172 |
| 79 | 3,788,174 |
| 83 | 3,788,175 |
| 114 | 3,788,176 |
| 171 | 3,788,178 |
| 437 | 3,788,179 |
| 449 | 3,788,180 |
| 454 | 3,788,177 |
| 554 | 3,788,173 |
| | 3,788,181 |
| 835 | 3,788,182 |

**CLASS 84**

| | |
|---|---|
| 291 | 3,788,183 |
| 454 | 3,788,184 |

**CLASS 85**

| | |
|---|---|
| 1JP | 3,788,185 |
| 49 | 3,788,187 |
| 62 | 3,788,186 |

**CLASS 89**

| | |
|---|---|
| 1F | 3,788,188 |
| 34 | 3,788,189 |
| 155 | 3,788,191 |
| 196 | 3,788,190 |

**CLASS 90**

| | |
|---|---|
| 40 | 3,788,192 |

**CLASS 91**

| | |
|---|---|
| 243 | 3,788,193 |
| 386 | 3,788,194 |
| 457 | 3,788,195 |

**CLASS 92**

| | |
|---|---|
| 13 | 3,788,196 |
| 77 | 3,788,197 |
| 86 | 3,788,198 |

**CLASS 93**

| | |
|---|---|
| 80 | 3,788,199 |

**CLASS 95**

| | |
|---|---|
| 1 | 3,788,200 |
| 1.1 | 3,788,201 |
| 4.5 | 3,788,203 |
| 11V | 3,788,202 |
| 55 | 3,788,204 |
| 93 | 3,788,205 |

**CLASS 96**

| | |
|---|---|
| 1C | 3,788,844 |
| 1R | 3,788,845 |
| 36.1 | 3,788,846 |
| | 3,788,847 |
| | 3,788,848 |
| 48HD | 3,788,849 |
| 67 | 3,788,850 |
| | 3,788,851 |
| | 3,788,852 |
| 69 | 3,788,853 |
| 82 | 3,788,854 |
| 84R | 3,788,855 |
| 87R | 3,788,856 |
| 100 | 3,788,857 |
| 115P | 3,788,858 |
| 139 | 3,788,859 |

**CLASS 98**

| | |
|---|---|
| 40DL | 3,788,206 |
| 42 | 3,788,207 |
| 115VM | 3,788,208 |

**CLASS 99**

| | |
|---|---|
| 349 | 3,788,209 |

**CLASS 100**

| | |
|---|---|
| 7 | 3,788,210 |
| 93P | 3,788,211 |
| 229A | 3,788,212 |

**CLASS 101**

| | |
|---|---|
| 37 | 3,788,213 |
| 96 | 3,788,214 |
| 116 | 3,788,221 |
| 123 | 3,788,215 |
| 127.1 | 3,788,216 |
| 128.1 | 3,788,217 |
| 180 | 3,788,218 |
| 363 | 3,788,220 |
| 425 | 3,788,219 |

**CLASS 102**

| | |
|---|---|
| 24R | 3,788,223 |
| 37.4 | 3,788,222 |
| 42C | 3,788,224 |
| 56 | 3,788,225 |
| 70R | 3,788,227 |
| 70.2R | 3,788,226 |
| | 3,788,228 |
| 74 | 3,788,229 |
| | 3,788,230 |

**CLASS 104**

| | |
|---|---|
| 23FS | 3,788,231 |
| 88 | 3,788,232 |
| | 3,788,233 |
| 152 | 3,788,234 |
| 191 | 3,788,235 |

**CLASS 105**

| | |
|---|---|
| 254 | 3,788,236 |
| 367 | 3,788,237 |
| 368R | 3,788,238 |
| 369B | 3,788,240 |
| 378 | 3,788,239 |

**CLASS 106**

| | |
|---|---|
| 21 | 3,788,863 |
| 38.3 | 3,788,864 |
| 39.7 | 3,788,865 |
| 69 | 3,788,866 |
| 73.31 | 3,788,867 |
| 90 | 3,788,868 |
| 93 | 3,788,869 |
| 108 | 3,788,870 |
| 291 | 3,788,871 |

**CLASS 108**

| | |
|---|---|
| 6 | 3,788,241 |
| 111 | 3,788,242 |

**CLASS 110**

| | |
|---|---|
| 8R | 3,788,243 |
| | 3,788,244 |

**CLASS 112**

| | |
|---|---|
| 79R | 3,788,245 |
| 83 | 3,788,246 |
| 121.12 | 3,788,247 |
| 121.29 | 3,788,248 |
| 158R | 3,788,249 |
| 219A | 3,788,250 |
| 252 | 3,788,251 |
| 256 | 3,788,252 |
| 402 | 3,788,253 |

**CLASS 114**
.5F 3,788,254
20R 3,788,255
39 3,788,256
3,788,257
219 3,788,260
230 3,788,258
235A 3,788,259
3,788,261
235R 3,788,262
3,788,263

**CLASS 115**
1R 3,788,264
12R 3,788,265
17 3,788,266
3,788,267

**CLASS 116**
28R 3,788,268
173 3,788,269

**CLASS 117**
10 3,788,872
21 3,788,873
23 3,788,874
36.2 3,788,875
38 3,788,876
62 3,788,877
62.2 3,788,878
68.5 3,788,879
70S 3,788,880
73 3,788,881
76T 3,788,882
100R 3,788,883
121 3,788,884
126AF 3,788,885
132BF 3,788,886
135.5 3,788,887
139.5A 3,788,888
201 3,788,889
3,788,890
212 3,788,891
3,788,892
216 3,788,893
217 3,788,894
218 3,788,895
235 3,788,896
236 3,788,897

**CLASS 118**
5 3,788,270
33 3,788,271
47 3,788,272
50 3,788,273
504 3,788,274
637 3,788,275

**CLASS 119**
1 3,788,276
29 3,788,277
51R 3,788,278
52R 3,788,279
99 3,788,280

**CLASS 122**
7R 3,788,281
34 3,788,282

**CLASS 123**
3 3,788,283
32EA 3,788,285
43C 3,788,286
52MV 3,788,287
97B 3,788,288
103B 3,788,289
117A 3,788,290
3,788,291
119A 3,788,284
122A 3,788,292
148E 3,788,293
179BG 3,788,294
188P 3,788,295

**CLASS 124**
7 3,788,297
11R 3,788,298
35R 3,788,299

**CLASS 126**
21R 3,788,300
59.5 3,788,301
374 3,788,302

**CLASS 128**
2F 3,788,305
2.06E 3,788,317
4 3,788,303
6 3,788,304
66 3,788,306
77 3,788,307
94 3,788,308
134 3,788,309
142 3,788,310
142.3 3,788,311
3,788,312
145.8 3,788,313
159 3,788,314
173H 3,788,315
200 3,788,316
214B 3,788,319
214.4 3,788,318
221 3,788,320
3,788,321
260 3,788,322
268 3,788,296
291 3,788,323
295 3,788,324
303R 3,788,325
305 3,788,326
350R 3,788,327
3,788,328
418 3,788,329

**CLASS 131**
10.5 3,788,330
143 3,788,331

**CLASS 132**
54 3,788,332

**CLASS 133**
2 3,788,333
4R 3,788,334

**CLASS 135**
1R 3,788,335
15PE 3,788,336

**CLASS 136**
27 3,788,898
86A 3,788,899
3,788,900
170 3,788,901

**CLASS 137**
1 3,788,337
3,788,338
93 3,788,340
115 3,788,339
209 3,788,341
3,788,343
218 3,788,342
271 3,788,344
318 3,788,345
330 3,788,346
355.17 3,788,347
512.1 3,788,351
523 3,788,352
542 3,788,348
565 3,788,349
596.18 3,788,350
604 3,788,353
625.11 3,788,355
625.17 3,788,356
625.4 3,788,354
805 3,788,357

**CLASS 138**
30 3,788,358

**CLASS 139**
26 3,788,359
122N 3,788,360
124 3,788,361
247 3,788,362
336 3,788,363
420R 3,788,364
421 3,788,365
3,788,366

**CLASS 140**
124 3,788,367

**CLASS 141**
67 3,788,368
114 3,788,369
125 3,788,370

**CLASS 144**
312 3,788,371
316 3,788,372

**CLASS 145**
30R 3,788,373

**CLASS 148**
11.5R 3,788,902
12.1 3,788,903
186 3,788,904
187 3,788,905

**CLASS 149**
2 3,788,909
6 3,788,906
22 3,788,907
42 3,788,908

**CLASS 150**
1 3,788,374

**CLASS 156**
3 3,788,911
6 3,788,912
11 3,788,913
18 3,788,914
19 3,788,915
74 3,788,916
82 3,788,917
171 3,788,918
184 3,788,919
202 3,788,920
216 3,788,921
244 3,788,922
3,788,923
249 3,788,924
269 3,788,925
286 3,788,926
290 3,788,927
294 3,788,928
307 3,788,929
3,788,930
309 3,788,931
499 3,788,932
513 3,788,933

**CLASS 159**
25A 3,788,375

**CLASS 160**
19 3,788,376
84R 3,788,377
135 3,788,378
235 3,788,379

**CLASS 161**
17 3,788,934
93 3,788,939
141 3,788,935
148 3,788,936
158 3,788,937
159 3,788,938
173 3,788,940
182 3,788,941

**CLASS 164**
26 3,788,380
52 3,788,381
150 3,788,382
156 3,788,383
252 3,788,384

**CLASS 165**
2 3,788,385
3,788,386
22 Re.27,907
27 3,788,387
32 3,788,388
45 3,788,389
65 3,788,391
74 3,788,390
92 3,788,392
109 3,788,393
134 3,788,394
169 3,788,395

**CLASS 166**
.5 3,788,396
117.5 3,788,397
269 3,788,398
274 3,788,399

**CLASS 169**
11 3,788,400

**CLASS 172**
801 3,788,401

**CLASS 173**
91 3,788,402
115 3,788,403
139 3,788,404

**CLASS 174**
28 3,789,129
115 3,789,130

**CLASS 175**
72 3,788,405
3,788,406
307 3,788,407
337 3,788,408
410 3,788,409

**CLASS 176**
19LD 3,788,942
35 3,788,943
60 3,788,944

**CLASS 177**
25 3,788,410
211 3,788,411

**CLASS 178**
5.1 3,789,131
5.4AC 3,789,134
5.4ST 3,789,132
5.4E 3,789,135
5.4R 3,789,133
5.8R 3,789,136
6.6A 3,789,138
3,789,139
6.6 3,789,137
7.81 3,789,140
69.5CB 3,789,141

**CLASS 179**
15AL 3,789,148
15BC 3,789,145
3,789,149
15BF 3,789,146
15BS 3,789,142
15.55R 3,789,143
15.55T 3,789,144
18ET 3,789,150
18FA 3,789,147
18GF 3,789,151
27D 3,789,153
81A 3,789,155
99 3,789,152
3,789,154
100.2CA 3,789,162
100.2C 3,789,156
3,789,158
100.2S 3,789,159
100.2Z 3,789,157
3,789,160
3,789,161
107S 3,789,163
156R 3,789,164
170.2 3,789,165
184 3,789,166

**CLASS 180**
5R 3,788,412
8A 3,788,413
26R 3,788,415
27 3,788,416
64A 3,788,417
68R 3,788,418
3,788,419
74 3,788,420
105R 3,788,421
114 3,788,422

**CLASS 181**
33K 3,788,423

**CLASS 182**
129 3,788,424
148 3,788,425

**CLASS 184**
1E 3,788,426
105C 3,788,427

**CLASS 187**
8.71 3,788,414
29R 3,788,428

**CLASS 188**
18A 3,788,429
72.6 3,788,430
109 3,788,431
138 3,788,432
314 3,788,433

**CLASS 192**
26 3,788,434
35 3,788,435
88B 3,788,436
98 3,788,437
110R 3,788,438

**CLASS 194**
61 3,788,439
99 3,788,440

**CLASS 195**
11 3,788,910
31F 3,788,945
31R 3,788,946
51R 3,788,947
68 3,788,948
100 3,788,949
103.5R 3,788,950
120 3,788,951
127 3,788,952

**CLASS 197**
1R 3,788,441
16 3,788,443
181 3,788,442

**CLASS 198**
2 3,788,444
36 3,788,445
3,788,446
41 3,788,447
56 3,788,448
107 3,788,449
131 3,788,450
3,788,451
139 3,788,452
153 3,788,453
168 3,788,454
182 3,788,455
204 3,788,457
3,788,458
218 3,788,459
220A 3,788,456
221 3,788,460
229 3,788,461

**CLASS 200**
5A 3,789,167
19R 3,789,168
50C 3,789,169
61.47 3,789,170
83S 3,789,171
148R 3,789,175
153SC 3,789,172
153J 3,789,173
168G 3,789,176
168R 3,789,174
172A 3,789,177

**CLASS 202**
173 3,788,953

**CLASS 203**
89 3,788,954

**CLASS 204**
25 3,788,955
35N 3,788,956
51 3,788,957
146 3,788,958
180P 3,788,959
3,788,960
181 3,788,961
195C 3,788,962
206 3,788,963
224M 3,788,964
234 3,788,965
256 3,788,966
277 3,788,967
290R 3,788,968
299 3,788,969

**CLASS 206**
.82 3,788,464
65S 3,788,462
3,788,463

**CLASS 208**
22 3,788,970
57 3,788,971
59 3,788,972
3,788,973
3,788,974
60 3,788,975
89 3,788,976
120 3,788,977
208M 3,788,978
255 3,788,979
333 3,788,980

**CLASS 209**
1 3,788,465
79 3,788,466
167 3,788,467

**CLASS 210**
20 3,788,981
24 3,788,982
28 3,788,983
30 3,788,984
33 3,788,985
59 3,788,468
73 3,788,469
78 3,788,470
94 3,788,471
103 3,788,472
112 3,788,473
137 3,788,474
167 3,788,475
194 3,788,476
195 3,788,477
197 3,788,478
198C 3,788,479
237 3,788,480
242 3,788,481
321 3,788,482
416 3,788,483
447 3,788,484
474 3,788,485
496 3,788,486

**CLASS 211**
49D 3,788,487
123 3,788,488
163 3,788,489
176 3,788,490

**CLASS 212**
25 3,788,491
55 3,788,492

**CLASS 213**
20 3,788,493

**CLASS 214**
1H 3,788,494
6B 3,788,495
6C 3,788,496
6P 3,788,497
10.5R 3,788,498
16.4B 3,788,499
41 3,788,500
83.3 3,788,501
84 3,788,502
147G Re.27,905
152 3,788,504
3,788,505
356 3,788,506
620 3,788,507

**CLASS 215**
40 3,788,508
3,788,510
42 3,788,509

**CLASS 219**
10.55 3,789,178
3,789,179
10.57 3,789,180
62 3,789,181
69C 3,789,182
92 3,789,183
117R 3,789,184
121EB 3,789,185
130 3,789,186
261 3,789,187
301 3,789,188
464 3,789,189
497 3,789,190
522 3,789,192

**CLASS 220**
9R 3,788,511
25 3,788,512
64 3,788,513
89A 3,788,514

**CLASS 221**
90 3,788,516
154 3,788,517
211 3,788,518

**CLASS 222**
83.5 3,788,519
94 3,788,520
3,788,521
146R 3,788,522
153 3,788,523
193 3,788,525
3,788,526
195 3,788,527
209 3,788,524
3,788,528
314 3,788,529
508 3,788,530

**CLASS 223**
118 3,788,531

**CLASS 224**
31 3,788,532

**CLASS 225**
96.5 3,788,533

**CLASS 226**
1 3,788,515
4 3,788,534
88 3,788,535
91 3,788,536

**CLASS 227**
142 3,788,537

**CLASS 229**
23R 3,788,538
72 3,788,540
77 3,788,539

**CLASS 235**
61R 3,788,541
61.11R 3,789,193
61.12M 3,788,617
92PC Re.27,902
92PK 3,789,194
92T 3,789,195
132A 3,789,196
150.27 3,789,197
3,789,198
150.5 3,789,199
151 3,789,200
151.21 3,789,201
151.33 3,789,202
152 3,789,203
153AC 3,789,205
153AM 3,789,204
172 3,789,206
183 3,789,207

**CLASS 239**
2R 3,788,542
3,788,543
11 3,788,544
34 3,788,545
120 3,788,546
129 3,788,547
132.3 3,788,548
242 3,788,551
276 3,788,552
309 3,788,549
315 3,788,553
332 3,788,554
336 3,788,555
337 3,788,550
349 3,788,556
401 3,788,557
424 3,788,558
533 3,788,559
553.5 3,788,561

**CLASS 240**
6.4R 3,789,208
7.1R 3,789,209
7.3 3,789,210
10R 3,789,211
51.11R 3,788,560
52R 3,789,212
69 3,789,213

**CLASS 241**
4 3,788,562
46A 3,788,564
46.11 3,788,563
3,788,565
69 3,788,568
73 3,788,566
214 3,788,569
247 3,788,567

**CLASS 242**
55.19A 3,788,574
55.2 3,788,573
84.21R 3,788,570
86.5R 3,788,575
195 3,788,571
199 3,788,576
210 3,788,572

**CLASS 243**
35 3,788,577

**CLASS 244**

1SD Re.27,903
3.28 3,788,578
77A 3,788,579

**CLASS 248**

14 3,788,580
22 3,788,581
56 3,788,582
146 3,788,583
154 3,788,584
178 3,788,585
373 3,788,586
400 3,788,587
467 3,788,588
488 3,788,589

**CLASS 249**

95 3,788,590
187 3,788,591

**CLASS 250**

206 3,789,215
3,789,220
211R 3,789,216
231SE 3,789,218
264 3,789,219
265 3,789,217
302 3,789,221
325 3,789,222
3,789,223
3,789,224
331 3,789,225
354 3,789,214
360 3,789,226
484 3,789,227
492 3,789,228

**CLASS 251**

25 3,788,592
28 3,788,593
58 3,788,594
3,788,595
69 3,788,596
129 3,788,597
149.6 3,788,598
181 3,788,599
214 3,788,600
304 3,788,601
312 3,788,602
345 3,788,603

**CLASS 252**

1 3,788,986
25 3,788,987
32.5 3,788,988
33 3,788,989
33.4 3,788,990
33.6 3,788,991
42.7 3,789,003
47.5 3,788,992
51.5A 3,788,993
62.1 3,788,994
3,788,995
62.54 3,788,996
63.5 3,788,997
65 3,788,998
91 3,788,999
95 3,789,000
99 3,789,001
3,789,002
171 3,789,004
3,789,005
3,789,006
3,789,007
180 3,789,008
301.1S 3,789,013
301.2W 3,789,012
301.4P 3,789,014
313S 3,789,009
316 3,789,010
3,789,015
367 3,789,011
437 3,789,016
3,789,017
439 3,789,018
3,789,063
440 3,789,019
442 3,789,020
446 3,789,021
462 3,789,022
465 3,789,025
466PT 3,789,024
518 3,789,023

**CLASS 254**

108 3,788,604
150FH 3,788,605
185 3,788,606
186R 3,788,607

**CLASS 256**

59 3,788,608

**CLASS 259**

5 3,788,609
54 3,788,611
177 3,788,610
182 3,788,612
185 3,788,613
191 3,788,614

**CLASS 260**

2.3 3,789,026
2.5AY 3,789,027
2.5B 3,789,028
2.5R 3,789,029
16 3,789,037
17R 3,789,039
17.2 3,789,038
17.3 3,789,040
3,789,041
17.4CL 3,789,042
17.5 3,789,043
18TN 3,789,044
3,789,045
23.7A 3,789,046
28.5R 3,789,047
29.6NR 3,789,030
30.2 3,789,048
40R 3,789,049
41A 3,789,051
41.5R 3,789,050
47CZ 3,789,052
47EN 3,789,053
47ET 3,789,054
51R 3,789,055
75NT 3,789,032
75T 3,789,031
77.5AM 3,789,034
77.5TB 3,789,033
78.5T 3,789,035
80.7 3,789,036
239.6 3,789,056
345.5 3,789,086
397.3 3,789,087
412.8 3,789,058
429.2 3,789,060
429.7 3,789,057
437R 3,789,059
455B 3,789,061
463 3,789,062
473S 3,789,064
497A 3,789,066
497R 3,789,065
505E 3,789,067
507R 3,789,068
514J 3,789,069
521R 3,789,070
553R 3,789,071
557B 3,789,072
558A 3,789,073
561N 3,789,074
583N 3,789,076
583R 3,789,075
648F 3,789,088
648R 3,789,089
669P 3,789,090
674SE 3,789,077
680E 3,789,078
681.5R 3,789,079
3,789,080
683.15D 3,789,081
683.68 3,789,082
873 3,789,084
878 3,789,083
897B 3,789,085
927R 3,789,091
932 3,789,092

**CLASS 261**

34A 3,788,615
64R 3,788,616
114R Re.27,908

**CLASS 264**

37 3,789,093
45 3,789,094
51 3,789,095
60 3,789,096
82 3,789,097
95 3,788,503
103 3,789,098
174 3,789,099
219 3,789,100
261 3,789,101
295 3,789,102
329 3,789,103

**CLASS 266**

3R 3,788,618
13 3,788,619
23R 3,788,620
27 3,788,621
32 3,788,622
33R 3,788,623
34T 3,788,624

**CLASS 267**

9C 3,788,626
64R 3,788,627
65R 3,788,628
3,788,630
66 3,788,629
156 3,788,631

**CLASS 269**

20 3,788,632
60 3,788,633
154 3,788,634
244 3,788,635

**CLASS 271**

4 3,788,636
13 3,788,637
51 3,788,638
53 3,788,639
64 3,788,640

**CLASS 273**

1M 3,788,641
1.5R 3,788,642
102.1G 3,788,643
134AD 3,788,644
156 3,788,645
183C 3,788,646
186A 3,788,647

**CLASS 274**

1R 3,788,649
23B 3,788,648

**CLASS 277**

34 3,788,651
38 3,788,650
70 3,788,653
71 3,788,652
212F 3,788,655
229 3,788,654

**CLASS 279**

1TS 3,788,657
1A 3,788,656
75 3,788,658

**CLASS 280**

5.24 3,788,659
11.35T 3,788,660
22 3,788,661
43.11 3,788,675
47.11 3,788,662
150AB 3,788,663
3,788,665
3,788,666
3,788,667
3,788,669
150SB 3,788,664
154.5R 3,788,668
203 3,788,670
303 3,788,671
404 3,788,672
423R 3,788,673
456 3,788,674

**CLASS 285**

55 Re.27,906
247 3,788,676
367 3,788,677

**CLASS 290**

40 3,789,229

**CLASS 292**

7 3,788,678
40 3,788,679
92 3,788,687
3,788,688
304 3,788,689

**CLASS 294**

17 3,788,690
19R 3,788,691
3,788,692
20 3,788,693
67BC 3,788,694
81R 3,788,680

**CLASS 296**

28M 3,788,682
28R 3,788,681
35A 3,788,683
36 3,788,684
65A 3,788,685
146 3,788,686

**CLASS 297**

6 3,788,695
159 3,788,696
307 3,788,697
373 3,788,698
390 3,788,699
442 3,788,700
455 3,788,701

**CLASS 298**

22AE 3,788,702

**CLASS 299**

14 3,788,703
18 3,788,704

**CLASS 301**

9DN 3,788,705
37P 3,788,706
3,788,707

**CLASS 303**

7 3,788,709
21F 3,788,710

**CLASS 305**

58 3,788,711

**CLASS 307**

1 3,789,230
9 3,789,231
10LS 3,789,232
17 3,789,233
88P 3,789,234
88.3 3,789,235
96 3,789,236
104 3,789,237
119 3,789,238
221C 3,789,239
223C 3,789,240
235R 3,789,242
238 3,789,243
251 3,789,244
255 3,789,241
288 3,789,245
304 3,789,246
3,789,247

**CLASS 308**

6C 3,788,708
35 3,788,712
160 3,788,713
187.2 3,788,714
217 3,788,715

**CLASS 310**

9.4 3,789,248
54 3,789,249
154 3,789,250
239 3,789,251
259 3,789,252

**CLASS 312**

29 3,788,716
122 3,788,717
184 3,788,718
198 3,788,719
211 3,788,720

**CLASS 313**

63 3,789,253
85S 3,789,254
217 3,789,255
313 3,789,256

**CLASS 315**

3 3,789,257
13CG 3,789,258
21PR 3,789,259
22 3,789,260
27TD 3,789,261
3,789,262
39.51 3,789,263
84.6 3,789,264
169TV 3,789,265
194 3,789,266

**CLASS 316**

17 3,788,721
19 3,788,722
20 3,788,723
3,788,724
3,788,725

**CLASS 317**

18D 3,789,268
23 3,789,269
99 3,789,270
101CC 3,789,271
137 3,789,272
141R 3,789,273
230 3,789,274
234R 3,789,275
235R 3,789,267
3,789,276
260 3,789,277
262A 3,789,278

**CLASS 318**

39 3,789,279
45 3,789,280
190 3,789,282
295 3,789,283
377 3,789,284
687 3,789,285
696 3,789,281
3,789,286

**CLASS 320**

48 3,789,287

**CLASS 321**

2 3,789,288
3,789,289
5 3,789,290

**CLASS 323**

119 3,789,291

**CLASS 324**

34R 3,789,292
51 3,789,293
54 3,789,294
3,789,295
58.5B 3,789,296
65R 3,789,297
71EB 3,789,298
95 3,789,299
103R 3,789,300
158T 3,789,301

**CLASS 325**

146 3,789,302
321 3,789,303

**CLASS 328**

41 3,789,304
140 3,789,305
150 3,789,306
155 3,789,307
3,789,308
169 3,789,309

**CLASS 330**

4.3 3,789,310
6 3,789,311
35 3,789,312
107 3,789,313
185 3,789,314
3,789,315

**CLASS 331**

12 3,789,316
94.5C 3,789,317
3,789,318
94.5 3,789,319
3,789,320
3,789,321
96 3,789,322

**CLASS 332**

18 3,789,323

**CLASS 333**

1.1 3,789,324
28R 3,789,325
3,789,326
30R 3,789,327
30 3,789,328
31A 3,789,330
31R 3,789,329

**CLASS 334**

82 3,789,331

**CLASS 335**

152 3,789,332
173 3,789,334
207 3,789,333
210 3,789,335
285 3,789,336

**CLASS 336**

60 3,789,337

**CLASS 337**

3 3,789,338
95 3,789,339

**CLASS 338**

24 3,789,191
28 3,789,340

**CLASS 339**

17CF 3,789,341
17F 3,789,342
49R 3,789,343
59M 3,789,344
75MP 3,789,345
89R 3,789,346
97R 3,789,347
198R 3,789,348
223S 3,789,349

**CLASS 340**

3R 3,789,350
4R 3,789,351
5C 3,789,352
5H 3,789,354
5T 3,789,353
8S 3,789,401
18LD 3,789,355
27NA 3,789,356
53 3,789,357
87 3,789,358
146.1AQ 3,789,360
146.1D 3,789,359
146.3AQ 3,789,361
147LP 3,789,362
162 3,789,363
166R 3,789,364
172.5 3,789,365
3,789,366
3,789,367
3,789,368
173CR 3,789,370
3,789,372
173LS 3,789,369
173R 3,789,371
174PW 3,789,374
3,789,376
174TF 3,789,373
3,789,375
174.1B 3,789,400
174.1C 3,789,378
174.1G 3,789,377
3,789,380
174.1H 3,789,379
207R 3,789,381
213R 3,789,382
237S 3,789,383
258B 3,789,384
324AD 3,789,386
324R 3,789,385
325 3,789,387
336 3,789,388
347AD 3,789,389
347DA 3,789,393
347DD 3,789,390
3,789,392
347SY 3,789,391
365R 3,789,394
373T 3,789,395
384E 3,789,402

**CLASS 343**

5DP 3,789,396
3,789,403
7.9 3,789,397
14 3,789,398
3,789,399
18B 3,789,404
18E 3,789,405
100PE 3,789,407
100R 3,789,406
105R 3,789,408
112D 3,789,410
112R 3,789,409
113R 3,789,411
3,789,413
114 3,789,412
761 3,789,414
763 3,789,415
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| | 71 | 230,135 |
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| | 254 | 230,139 |
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## DESIGN PATENTS

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## PLANT PATENTS

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Frederick B. Dent, *Secretary*